UCRL-MI-135701-PH-1-VOL-3

Array Experiments (Phase 1) Volume 3

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Lawrence
Livermore
National
Laboratory

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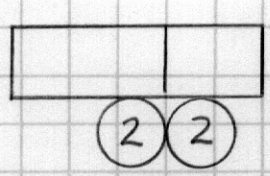
ARRAY EXPERIMENT VOL-3

3-8-66

Assembly G-9

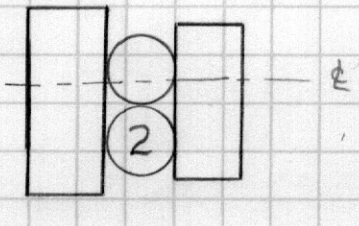
Parts 001, 002, 004, 005 Base Rate = 8.041×10^{5} n/sec



Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.00	16017/15"	1.88×10^{5}	37.64	4.68	4291/15"	5.92×10^{5}	28.24	3.51
H 0.00	20.02				4.77		$\bar{M} = 4.10$	

Assembly G-10

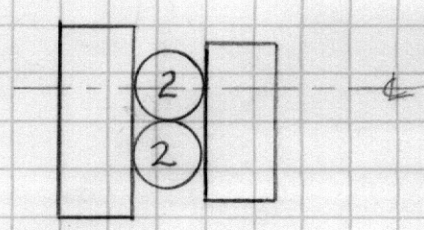
Parts 001, 002, 004 Base Rate = 6.067×10^{5} n/sec



V 0.00	10711/15"	2.83×10^{5}	28.92	4.77	7940/15"	1.98×10^{5}	17.46	2.88
H 0.00	11.90				8.82		$\bar{M} = 3.82$	

Assembly G-11

Parts 001, 002, 004, 005 Base Rate = 8.041×10^{5} n/s



V 0.00	16182/15"	2.83×10^{5}	43.59	5.42	15435/15"	1.98×10^{5}	33.96	4.22
H 0.00	17.94				17.15		$\bar{M} = 4.82$	

T/C's Room = 73 °F #1 = 100 °F (Top Cm) #2 = 89 °F (Bottom Cm

Total Vertical Spacing = 3.611 cm

Total Lateral Spacing = 3.756 cm

3-9-66

Assembly G-12 : Pu to Pu spacing 20.00 cm

Lateral Spacing : 0.690 fixed + 19.304 variable = 19.994 cm

Vertical Spacing : 3.611 fixed + 16.389 variable = 20.000 cm

Moderator Thickness per cell 1.27 cm (2.54 cm between members)

Base Rate = 16.081×10^5 n/sec Parts (001, 002, 004, 005, 006, 007, 008, 009)

Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.00	13234/15	2.53×10^5	37.19	2.31	19572/15	2.03×10^5	44.15	2.75
H 0.00	14.70				21.75		$\bar{M}$ = 2.53	

T/C's Room = 73 °F #1 = 93 °F (001) #2 = 104 °F (005)

Assembly G-13 : Pu to Pu spacing 15.00 cm

Lateral Spacing : 0.690 fixed + 14.277 = 14.967 cm

Vertical Spacing : 3.611 fixed + 11.379 = 14.990 cm

Moderator Thickness per cell 1.27 cm (2.54 cm between members)

Base Rate = 16.081×10^5 n/sec Parts (001, 002, 004, 005, 006, 007, 008, 009)

Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.00	9241/10	2.53×10^5	38.96	2.42	13776/10	2.03×10^5	46.60	2.90
H 0.00	15.40				22.96		$\bar{M}$ = 2.66	
A 15.00								

T/C's Room = 73 #1 = 99 #2 = 88

Assembly G-14 : Pu to Pu spacing 10.00 cm

Lateral Spacing : 0.690 fixed + 19.284 = 9.974 cm

Vertical Spacing : 3.611 fixed + 6.383 = 9.994 cm

Moderator Thickness per cell 1.27 cm (2.54 cm between members)

Base Rate = 16.081×10^5 n/s Parts (001, 002, 004, 005, 006, 007, 008, 009)

Position	Cts T-1	Effi Factor	10^5 n/s	M	Cts T-2	Effi Factor	10^5 n/s	M
V 0.00	10125/10	2.53×10^5	42.71	2.66	15011/10	2.03×10^5	5-0.79	3.16
H 0.00	16.88				25.02			$\bar{M} = 2.91$
A 15.00								

T/C's Room = 74 #1 = 95.5⁻ #2 = 98.5⁻

3-10-66

Assembly G-15 : Pu to Pu spacing 5.00 cm

Lateral Spacing : 0.690 fixed + 4.282 = 4.972 cm

Vertical Spacing : 3.611 fixed + 1.374 = 4.985 cm

Moderator Thickness per cell 1.27 cm (2.54 cm between members)

Base Rate = 16.081×10^5 n/s Parts (001, 002, 004, 005, 006, 007, 008, 009)

V 0.00	14407/10	2.53×0^5	60.75⁻	3.78	20725/10	2.03×0^5	70.12	4.36
H 0.	24.01				34.54			$\bar{M} = 4.07$
A 15.00								

T/C's Room = 73 #1 = 99 #2 = 88.5⁻

Assembly G-16 : Pu to Pu spacing 4.50 cm

Lateral Spacing : 0.690 fixed + 3.785⁻ = 4.475⁻ cm

Vertical Spacing : 3.611 fixed + 1.879 = 4.490 cm

V 0.00	15662/10	2.53×0^5	66.03	4.11	22772/10	2.03×10^5	77.04	4.79
H 0.00	26.10				37.95⁻			$\bar{M} = 4.45^-$
A 15.00								

T/C's Room = 73.5 #1 = 95.5 #2 = 90.5⁻

Same Moderator thickness and Base Rate as G-15⁻.

Assembly G-17: Pu to Pu 4.00 cm

Lateral Spacing: 0.690 fixed + 3.302 = 3.992 cm

Vertical Spacing: 3.611 fixed + 0.376 = 3.987 cm

Moderator Thickness per cell 1.27 cm (2.54 cm between members)

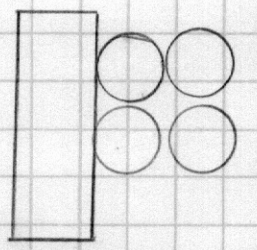
Base Rate = 16.081×10^{-5} n/s Parts (001, 002, 004, 005, 006, 007, 008, 009)

Position	Cts T-1	Eff Factor	10^{-5} n/s	M	Cts T-2	Eff. Factor	10^{-5} n/s	M
V 0.000	16057/10	2.53×10^{-5}	76.15	4.74	26218/10	2.03×10^{-5}	88.71	5.52
H 0.000	30008				43.70		$\bar{M} = 5.13$	
A 15.000								

T/C's Room = 72.5 #1 = 93.5 #2 = 92.

Assembly G-17R: Pu to Pu spacing same as G-17

Large reflector added to the vertical table



V 0.00	20708/10	2.45×10^{-5}	84.55	5.25	29790/10	2.11×10^{-5}	104.59	6.50
H 0.00	34.51				49.57		$\bar{M} = 5.87$	
A 15.00								

T/C's Room = 72.5 #1 = 97 #2 = 94

Assembly G-18: Pu to Pu spacing Min.

Lateral Spacing: 0.690 fixed + 2.908 = 3.598 cm

Vertical Spacing: 3.611 fixed + 0.000 = 3.611 cm

$\bar{Z} = 3.604$

Moderator Thickness per cell 1.27 cm (2.54 cm between members)

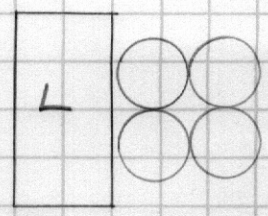
Base Rate = 16.081×10^{-5} n/s Parts (001, 002, 004, 005, 006, 007, 008, 009)

Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.00	20105/10	2.53×10^5	84.78	5.27	29727/10	2.03×10^5	100.59	6.26
H 0.00	33.51				49.55		$\bar{M} = 5.76$	
A 15.00								

T/C's Room = 74 #1 = 88.5 #2 = 87.5

3-11-66

Assembly G-18R



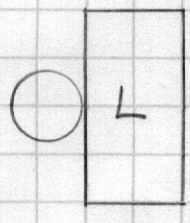
V 0.00	24782/10	2.45×10^5	101.19	6.29	35016/10	2.11×10^5	123.14	7.66
H 0.00	41.30				58.36		$\bar{M} = 6.97$	
A 15.00								

~~3-11-66~~ Hence - No int. for this moderator thickness.

Begin series with 2.54 cm moderator (5.08 cm between parts)

Assembly H-1

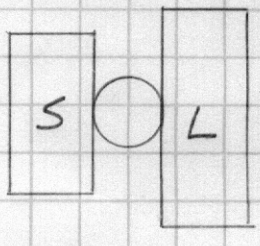
Part 001 Base rate 2.030×10^5 n/sec



V 0.00	1378/10	2.45×10^5	5.63	2.30	2005/10	2.11×10^5	7.05	3.47
H 0.00	2.30				3.34		$\bar{M} = 2.88$	

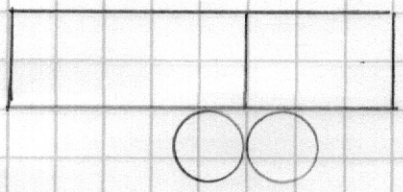
Assembly H-2

Part 001



V 0.00	778/6.00	2.34×10^5	5.05	2.49	1101/6.00	2.02×10^5	6.18	3.04
H 0.00	2.16				3.06		$\bar{M} = 2.76$	

Assembly H-3



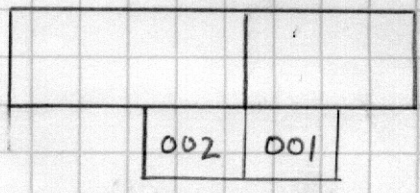
Parts 001, 002, Base rate 4.077×10^5 n/sec

Position	Cts T-1	Eff. Factor	10^5 n/sec	M	Cts T-2	Eff. Factor	10^5 n/sec	M
V 0.00	3936/10	1.88×10^5	12.33	3.02	1160/10	5.92×10^5	11.43	2.80
H 0.00	6.56				1.93		$\bar{M} = 2.91$	

3-14-66

Assembly H-4

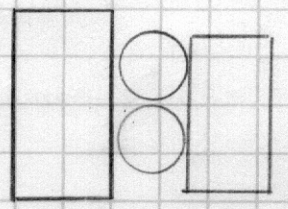
Parts 001, 002 Base Rate = 4.077×10^5 n/s



V 0.00	5724/15	2.26×10^5	14.37	3.52	3053/15	2.73×10^5	9.25	2.27
H 0.00	6.36				3.39		$\bar{M} = 2.90$	

Assembly H-5

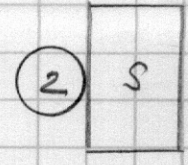
Parts 001, 002 Base Rate = 4.077×10^5 n/s



V 0.00	3897/15	2.43×10^5	10.52	2.58	5659/15	1.98×10^5	12.45	3.05
H 0.00	4.33				6.29		$\bar{M} = 2.82$	

Assembly H-6

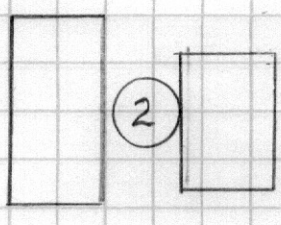
Parts 001, 002 Base Rate = 4.077×10^5 n/s



V 0.00	4777/15	2.46×10^5	13.06	3.20	5923/15	1.90×10^5	12.50	3.07
H 0.00	5.31				6.58		$\bar{M} = 3.14$	

Assembly H-7

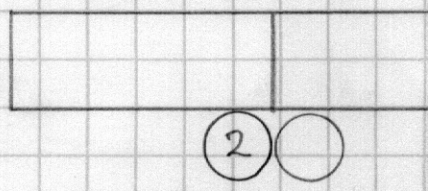
Parts 001, 002 Base Rate = 8.077×10^{-5} n/s



Position	C_2T-1	Eff. Factor	10^5 n/s	M	C_3T-2	Eff Factor	10^5 n/s	M
V 0.00	3990/12	2.40×10^{-5}	13.30	3.26	4812/12	2.03×10^{-5}	13.56	3.33
H 0.00	5.54				6.68		$\bar{M} = 3.29$	

Assembly H-8

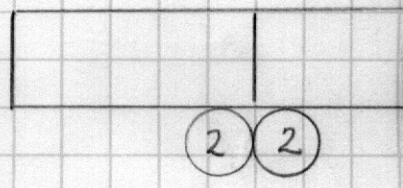
Parts 001, 002, 004 Base Rate = 6.067×10^{-5} n/s



V 0.00	7252/12	1.88×10^{-5}	18.93	3.12	2050/12	5.92×10^{-5}	17.17	2.83
H 0.00	10.07				2.90		$\bar{M} = 2.98$	

Assembly H-9

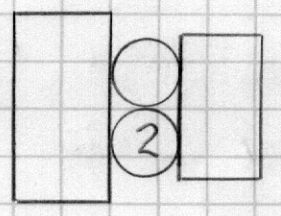
Parts 001, 002, 004, 005 Base Rate = 8.041×10^{-5} n/s



V 0.00	10754/12	1.88×10^{-5}	28.09	3.49	2859/12	5.92×10^{-5}	23.74	2.95
H 0.00	14.98				4.01		$\bar{M} = 3.22$	

Assembly H-10

Parts 001, 004, 005 Base Rate = 5.998×10^{-5} n/s

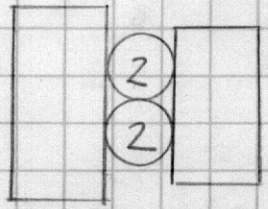


V 0.00	4536/10	2.40×10^{-5}	18.14	3.03	4921/10	2.03×10^{-5}	16.65	2.78
H 0.00	7.56				8.20		$\bar{M} = 2.90$	

3-15-66

Assembly H-11

Parts 001, 002, 004, 005 Base Rate = 8.041×10^{-5} n/s



V 0.00	5869/10	2.40×10^{-5}	23.47	2.91	8537/10	2.03×10^{-5}	28.89	3.59
H 0.00	9.78				14.23		$\bar{M} = 3.25$	

Assembly H-12 : Pu to Pu 20.00 cm

Lateral Spacing : 0.690 fixed + 19.310 = 20.000 cm

Vertical Spacing : 6.159 fixed + 13.833 19.992 cm

Moderator Thickness per cell 2.54 cm (5.08 cm between members)

Base Rate = 16.081×10^5 n/s Parts (001, 002, 008, 005, 006, 007, 008, 009)

Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.00	9837/10	2.53×10^{-5}	39.80	2.47	13582/10	2.03×10^{-5}	45.96	2.86
H 0.00	15.73				22.64		$\bar{M} = 2.66$	

T/C's Room = 72 #2 = 95 °F (004) #3 = 97 °F (001)

Assembly H-13 : Pu to Pu 15.00 cm

Lateral Spacing : 0.690 fixed + 14.300 = 14.990 cm

Vertical Spacing : 6.159 fixed + 8.827 = 14.996 cm

Moderator Thickness per cell 2.54 cm (5.08 cm between members)

Base Rate = 16.081×10^5 n/s Parts (001, 002, 008, 005, 006, 007, 008, 009)

V 0.00	9920/10	2.53×10^{-5}	41.82	2.60	14673/10	2.03×10^{-5}	49.65	3.09
H 0.00	16.53				24.46		$\bar{M} = 2.84$	

T/C's Room = 73 #2 = 93 #3 = 97

3-16-66

Assembly H-14 : Pu to Pu 10.00 cm

Lateral Spacing : 0.690 fixed + 9.301 = 9.991 cm

Vertical Spacing : 6.159 fixed + 3.830 = 9.989 cm

Moderator Thickness per cell 2.54 cm (5.08 cm between members)

Base Rate = 16.081×10^5 n/s Parts (001, 002, 008, 005, 006, 007, 008, 009)

V 0.00	11208/10	2.53×10^{-5}	47.26	2.94	16048/10	2.03×10^{-5}	54.30	3.38
H 0.00	18.68				26.75		$\bar{M} = 3.16$	

T/C's Room = 72 #2 = 94 #3 = 94

Assembly H-15 : Pu to Pu 6.123 cm (Min. Spacing)

Lateral Spacing: 0.690 fixed + 5.433 cm = 6.123 cm

Vertical Spacing: 6.159 fixed + = 6.159 cm

$\bar{z}$ = 6.141

Moderator Thickness per cell 2.54 cm (5.08 cm between members)

Base Rate = 16.081 $\times 10^{-5}$ n/s

Position	Cts T-1	Eff. Factor	10^{-5} n/s	M	Cts T-2	Eff. Factor	10^{-5} n/s	M
V 0.00	15261/10	2.53×10^{-5}	64.36	4.00	23064/10	2.03×10^{-5}	78.03	4.85
H 0.00	25.44				38.44		$\bar{M}$ = 4.42	
A 15.00								

T/C's Room = 73 #2 = 91 #3 = 84.5

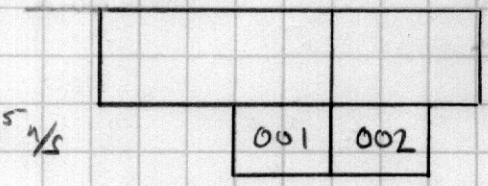
Assembly H-15R : Same Pu to Pu Spacing as H-15
Has large reflector on vertical table

V 0.00	16481/10	2.45×10^{-5}	67.30	4.19	23980/10	2.11×10^{-5}	84.34	5.25
H 0.00	27.47				39.97		$\bar{M}$ = 4.72	
A 15.00								

T/C's Room = 73 #2 = 94 #3 = 88

We will now look at a double unit (6 Kg) moderated and reflected.

Assembly I-1



Parts 001, 002 Base Rate = 4.077×10^{-5} n/s

V 0.00	1846/5	1.88×10^{-5}	11.56	2.84	1203/5	3.10×10^{-5}	12.43	3.05
H 4.000	6.15				4.01			

Moderator Thickness per 6 Kg part 3.81 cm

V 0.00	7480/10	1.88×10^{-5}	23.44	5.75	3962/10	3.10×10^{-5}	20.46	5.02
H 0.00	12.47				6.60		$\bar{M}$ = 5.39	

Assembly I-2 : Same as I-1 except with reflectors removed.

Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.00	6731/10	2.54×10^{-5}	26.50	6.99	6109/10	2.51×10^{-5}	25.55	6.27
H 0.00	11.22				10.18			$\bar{M} = 6.63$

3-17-66

CHECK Eff. Factors for I-2 and I-1 (Source MRC 8-7, 1.3 x 10^2 n/s)

Assembly I-2 Eff. Factor Calculation.

		T-1	T-2
Count Rates :	c/m	15373/5	15533/5
	c/sec	51.24	51.78
	Eff.	3.99×10^{-6}	3.98×10^{-6}
	Eff. Factor	2.54×10^{-5}	2.51×10^{-5}

Assembly I-1 Eff. Factor Calculations

		T-1	T-2
Count Rates :	c/m	16153/5	12580/5
	c/s	53.88	41.93
	Eff.	4.14×10^{-6}	3.23×10^{-6}
	Eff. Factor	2.42×10^{-5}	3.10×10^{-5}

3-21-66

Vertical table drop time was checked with empty table.

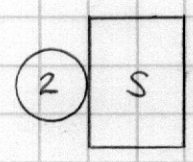
Release time = 60 ms (Magnet power set @ 25 volts .09 amps)

Drop time for .5 in = 138 ms

For the second time we have had trouble with the differential of the gear box for the vertical table. One gear in the differential was frozen to the shaft as before.

Assembly I-3

Parts 001, 002, Base Rate = 4.077×10^{-5} n/s



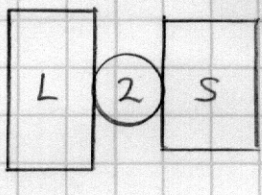
Moderator thickness per 6 Kg part = 3.81 cm

Position	Cts T-1	Eff. Factor	10^{-5} n/s	M	Cts T-2	Eff. Factor	10^{-5} n/s	M
V 0.00	5672/10	2.46×10^{-5}	23.25	5.7	8417/10	1.90×10^{-5}	26.66	6.54
H 0.00	9.45				14.03			$\bar{M} = 6.12$

T/C's Room = 72.5 #2 = 100 (002) #3 = 97.5 (001)

Assembly I-4

Parts 001, 002 Base Rate = 4.077×10^{-5} n/s



Moderator Thickness per 6 kg part = 3.81 cm

V 0.00	6468/10	2.43×10^{-5}	24.20	6.43	6790/10	1.98×10^{-5}	29.01	7.12
H 0.00	10.78				14.65			$\bar{M} = 6.78$

T/C's Room = 73 #2 = 99 #3 = 97

Assembly I-5

Parts 001, 002 Base Rate = 4.077×10^{-5} n/s

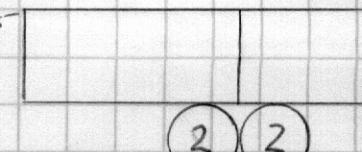
Moderator Thickness per 6 kg part = 3.81 cm

V 0.00	5296/10	2.52×10^{-5}	22.25	5.46	8099/10	1.86×10^{-5}	25.11	6.16
H 0.00	8.83				13.50			$\bar{M} = 5.81$

T/C's Room = 73.5 #2 = 99 #3 = 97

Assembly I-6

Parts 001, 002, 004, 005 Base Rate = 8.041×10^{-5}

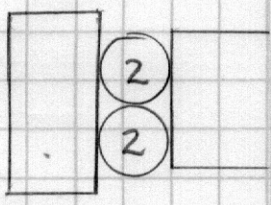


Moderator Thickness per 6 kg part = 3.81 cm

V 0.00	19258/10	1.88×10^{-5}	60.35	7.51	5363/10	5.92×10^{-5}	52.92	6.58
H 0.00	32.10				8.94			$\bar{M} = 7.05$

T/C's Room = 73.5 #2 = 94 #3 = 99

Assembly I-7



Parts 001, 002, 004, 005 Base Rate = 8.041×10^5 n/s

Moderator Thickness per 6 Kg part = 3.81 cm

Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.00	6780/s	2.43×10^5	54.92	6.83	9339/s	1.98×10^5	61.89	7.70
H 0.00	22.60				31.24			$\bar{M} = 7.27$

T/C's Room = 73 #3 = 98

3-22-66

Assembly I-8 : Pu to Pu 20.000 cm

Lateral Spacing : 0.690 fixed + 19.286 = 19.976 cm

Vertical Spacing : 0.442 fixed = 0.442 cm

Moderator Thickness per 6 Kg cell = 3.81 cm

Base Rate = 16.081×10^5 n/s Parts (001, 002, 004, 005, 006, 007, 008, 009)

									7.75
V 0.00	10793/s	~~2.83×10^5~~	~~91.03~~	~~5.66~~	15908/s	~~2.03×10^5~~	~~107.65~~	6.69
H 0.00	35.98	3.42	123.05	7.65	53.03	2.35	128.62	$\bar{M} = 6.18$
									7.70

T/C's Room = 73 #2 = 101 (005) #3 = 91 (001)

Assembly I-9 : Pu to Pu 15.000 cm

Lateral Spacing : 0.690 fixed + 14.315 = 15.005 cm

Vertical Spacing : 0.442 fixed = 0.442 cm

Moderator Thickness per 6 Kg cell = 3.81 cm

Base Rate = 16.081×10^5 n/s

									8.64
V 0.00	12558/s	~~2.83×10^5~~	~~140.23~~	~~6.61~~	17737/s	~~2.03×10^5~~	~~120.01~~	~~7.46~~
H 0.00	41.99	3.42	143.61	8.93	59.12	2.35	138.93	$\bar{M} =$ ~~9.04~~
									8.79

T/C's Room = 72.5 #2 = 90 #3 = 90

Assembly I-10 : Pu to Pu 10.00 cm

Lateral Spacing : 0.690 fixed + 9.317 = 10.007 cm

Vertical Spacing : 0.442 fixed = 0.442 cm

Moderator Thickness per 6kg cell = 3.81 cm

Base Rate = 16.081 $\times 10^5$ n/s

Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff Factor	10^5 n/s	M
V 0.00	18631/s	~~2.83~~ 3.42 $\times 10^5$	~~157.11~~ 212.38	~~9.97~~ 13.21	26738/s	~~2.83~~ 2.35 $\times 10^5$	~~185.93~~ 209.96	~~11.25~~ 13.63
H 0.500	62.10				89.13			M = ~~10.51~~ 13.12
A 15.00								

T/C's Room = 72.5 #2 = 98 #3 = 93

V 0.00	19537/s	~~2.83~~ 3.42 $\times 10^5$	~~169.58~~ 222.74	~~10.25~~ 13.85	27610/s	~~2.83~~ 2.35 $\times 10^5$	~~186.82~~ 216.27	13.45 ~~11.62~~
H 0.00	65.13				92.03			M = ~~10.94~~ 13.65
A 15.00								

T/C's Room = 72.5 #2 = 97.5 #3 = 94

Assembly I-11 : Pu to Pu 8.700 cm (Min. Spacing)

Lateral Spacing : 0.690 fixed + 8.019 = 8.709 cm

Vertical Spacing : 0.442 fixed = 0.442 cm

Moderator Thickness per 6Kg cell = 3.81 cm

Base Rate = 16.081 $\times 10^5$ n/s

Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff Factor	10^5 n/s	M
V 0.000	14292/s	~~2.83~~ 3.42 $\times 10^5$	~~120.53~~ 162.93	~~7.50~~ 10.13	20801/s	~~2.83~~ 2.35 $\times 10^5$	~~140.76~~ 162.95	~~8.73~~ 10.13
H 9.491	47.64				69.34			$\bar{M}$ = ~~8.13~~ 10.13
A 15.00								

T/C's Room = 73 #2 = 98 #3 = 91.5

V 0.000	18926/s	~~2.83~~ 3.42 $\times 10^5$	~~159.62~~ 215.77	~~9.93~~ 13.42	27256/s	~~2.83~~ 2.35 $\times 10^5$	~~184.43~~ 213.50	13.28 ~~11.47~~
H 3.000	63.09				90.85			M = ~~10.70~~ 13.35
A 15.00								

T/C's Room = 72.5 #2 = 97 #3 = 94

Position	Ch 2 T-1	Eff Factor	10^5 n/s	M	Ch 2 T2	Eff Factor	10^5 n/s	M
V 0.00	27098/5	~~2.53 x 10^{-5}~~ 3.42	~~228.53~~ 308.93	~~14.2~~ 19.2	38753/5	~~2.03 x 10^{-5}~~ 2.35	~~262.24~~ 303.57	~~16.3~~ 18.9
H 0.00	90.33				129.18			M = ~~15.25~~ 19.05
A 15.00								

T/C's Room = 72.5 #2 = 97 #3 = 90

3-23-66

A re-check of the Eff. Factors of Assembly I-11 will be made. The array will be set up and source MRC 8-7 will be placed in the center of each of the 4 cols. and the avg. eff. factor taken with and without a reflector. (MRC 8-7 = 1.3×10^5 n/s)

Without Reflector:

		I-1	I-2
Count Rates: Col. 1	c/m	8561/5	22895/5
	c/s	28.54	76.31
	Eff.	2.20×10^{-6}	5.87×10^{-6}
	Eff. Factor	4.55×10^5	1.70×10^5
Count Rates: Col. 2	c/m	9077/5	24141/5
	c/s	30.26	80.47
	Eff.	2.33×10^{-6}	6.19×10^{-6}
	Eff. Factor	4.29×10^5	1.62×10^5
Count Rates: Col. 3	c/m	16007/5	12632/5
	c/s	53.36	42.11
	Eff.	4.10×10^{-6}	3.24×10^{-6}
	Eff. Factor	2.44×10^5	3.09×10^5
Count Rates: Col. 4	c/m	16266/5	13143/5
	c/s	54.22	43.81
	Eff	4.17×10^{-6}	3.37×10^{-6}
	Eff. Factor	2.40×10^5	2.97×10^5
	Avg.	3.42×10^5	2.35×10^5

With Large Reflector on Vertical Table

		I-1	I-2
Count Rates : Col. 1	C/m	8764/s⁻	22386/s⁻
	C/s	29.21	74.62
	Eff.	2.25×10^{-6}	5.74×10^{-6}
	Eff. Factor	4.44×10^{5}	1.74×10^{5}
Count Rates : Col. 2.	C/m	8570/s⁻	23740/s⁻
	C/s	28.37	79.13
	Eff.	2.18×10^{-6}	6.09×10^{-6}
	Eff. Factor	4.59×10^{5}	1.64×10^{5}
Count Rates Col. 3	C/m	14507/s⁻	13558/s⁻
	C/s	48.36	45.19
	Eff	3.72×10^{-6}	3.48×10^{-6}
	Eff. Factor	2.69×10^{5}	2.87×10^{5}
Count Rates Col. 4	C/m	16838/s⁻	11532/s⁻
	C/s	56.13	38.44
	Eff.	4.32×10^{-6}	2.96×10^{-6}
	Eff. Factor	2.31×10^{5}	3.38×10^{5}
	Avg.	3.51×10^{5}	2.41×10^{5}

Assembly I-11R : Pu to Pu 8.700 cm (Min. Spacing)

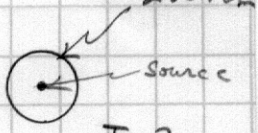
Same Spacing as I-11
Large Reflector added to vertical table.

Moderator Thickness per 6 Kg cell = 3.81 cm

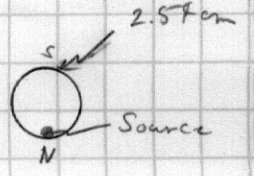
Base Rate = 16.081×10^{5} n/s

	Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V	0.00	20969/5	3.51×10^{5}	245.34	15.26	30841/5	2.41×10^{5}	247.75	15.41
H	3.00	69.90				102.80			$\bar{M} = 15.34$
A	15.00								
	T/C's	Room = 73				# 2 = 88.5			# 3 = 91.5
V	0.00	13481/2	3.51×10^{5}	394.31	24.52	18926/2	2.41×10^{5}	380.11	23.64
H	0.00	112.34				157.72			$\bar{M} = 24.08$
A	15.00								
	T/C's	Room = 73				# 2 = 89			# 3 = 92

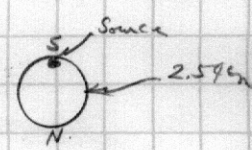
Eff. Factor calculations will be done for the safety assemblies for the 1.27 cm and 2.54 cm moderator thicknesses with source MRC-8-7 (1.3×10^{7} n/s)



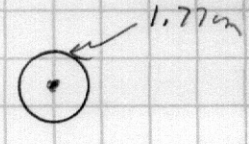
		T-1	T-2
Count Rates:	c/m	13450/5	20499/5
Moderator = 2.54cm	c/s	44.83	68.33
	Eff	3.45×10^{-6}	5.26×10^{-6}
	Eff. Factor	2.90×10^{5}	1.90×10^{5}



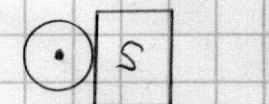
Count Rates:	c/m	14850/5	19319/5
Moderator = 2.54cm	c/s	49.50	64.40
	Eff	3.81×10^{-6}	4.95×10^{-6}
	Eff. Factor	2.62×10^{5}	2.02×10^{5}



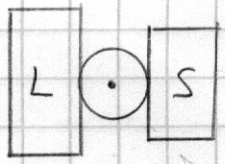
Count Rates:	c/m	12886/5	21413/5
Moderator = 2.54cm	c/s	42.96	71.38
	Eff.	3.30×10^{-6}	5.45×10^{-6}
	Eff. Factor	3.03×10^{5}	1.82×10^{5}



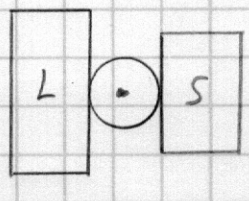
Count Rates:	c/m	13715/5	20677/5
Moderator = 1.27cm	c/s	45.72	68.92
	Eff	3.52×10^{-6}	5.30×10^{-6}
	Eff. Factor	2.84×10^{5}	1.89×10^{5}



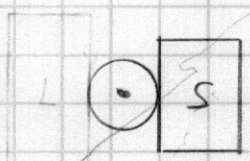
Count Rates:	c/m	14092/5	21270/5
Moderator = 1.27cm	c/s	46.97	70.90
	Eff.	3.61×10^{-6}	5.45×10^{-6}
	Eff. Factor	2.77×10^{5}	1.83×10^{5}



		T-1	T-2
Count Rates :	c/m	14438/s	20547/s
Moderator = 1.27 cm	c/s	48.12	68.49
	Eff	3.70×10^{-6}	5.27×10^{-6}
	Eff. Factor	2.70×10^{5}	1.90×10^{5}



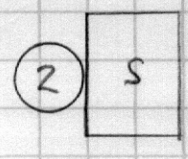
Count Rates :	c/m	14378 /s	21092 /s
Moderator = 2.54 cm	c/s	47.93	70.31
	Eff.	3.69×10^{-6}	5.41×10^{-6}
	Eff. Factor	2.71×10^{5}	1.85×10^{5}



Count Rates :	c/m	14256 /s	21194 /s
Moderator = 2.54 cm	c/s	47.52	70.50
	Eff.	3.66×10^{-6}	5.42×10^{-6}
	Eff. Factor	2.73×10^{5}	1.85×10^{5}

We will now begin the safety measurements for the 2.54 cm moderator thickness.

Assembly J-1 :

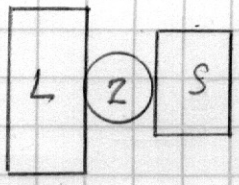


Parts 001, 002, Base Rate = 4.077×10^{5} n/s

Moderator Thickness per 6 kg cell = 2.54 cm

	Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V	0.00	7409/15	2.73×10^{5}	22.47	5.51	11041/15	1.85×10^{5}	22.70	5.57
H	0.00	8.23				12.27			$\bar{M} = 5.54$

Assembly J-2



Parts 001, 002 Base Rate = 8.079×10^{5} n/s

Moderator Thickness per 6kg cell = 2.54 cm

Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff. Factor	10^5 n/s	M
V 0.00	8187/15	2.71×10^{5}	24.66	6.05	11482/15	1.85×10^{5}	23.51	5.77
H 0.00	9.10				12.71			$\bar{M} = 5.91$

Assembly J-3

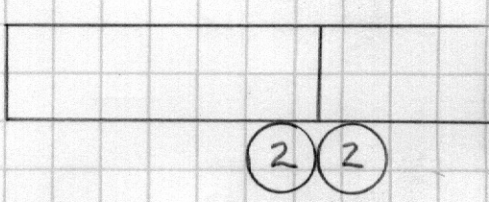
Parts 001, 002 Base Rate = 4.077×10^{5} n/s

Moderator Thickness per 6 kg cell = 2.54 cm

V 0.00	6759/15	2.90×10^{5}	21.78	4.57	10349/15	1.90×10^{5}	21.85	5.36
H 0.00	7.51				11.50			$\bar{M} = 4.97$

Assembly J-4

Parts 001, 002, 004, 005 Base Rate = 8.041×10^{5} n/s



Moderator Thickness per 6 kg cell = 2.54 cm

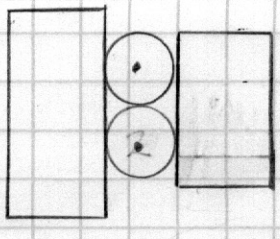
V 0.00	18009/10	2.13×10^{5}	63.94	7.95	4997/10	5.73×10^{5}	47.73	5.94
H 0.00	30.02				8.33			$\bar{M} = 6.95$

3-24-66 Magnet power increased to 29 volts because of table droping.

Eff. Factor calculation for this assembly (J-4)

		T-1	T-2
Count Rates:	c/m	7199/2	2711/2
Moderator = 2.54 cm	c/s	59.99	22.59
West Col.	Eff	4.61×10^{-6}	1.74×10^{-6}
	Eff. Factor	2.17×10^{5}	5.75×10^{5}
Count Rates:	c/m	7455/2	2732/2
East Col.	c/s	62.13	22.77
	Eff	4.78×10^{-6}	1.75×10^{-6}
	Eff Factor	2.09×10^{5}	5.71×10^{5}
Avg.		2.13×10^{5}	5.73×10^{5}

Eff. Factor Calculations:

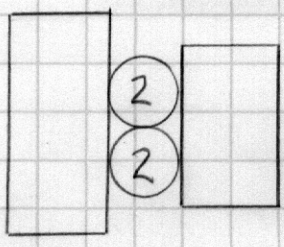


		T-1	T-2
Count Rates:	$\dot{\gamma}_m$	17176/s	12966/s
Moderator = 2.54 cm	$\dot{\gamma}_s$	57.25	43.22
North Col.	Eff	4.40×10^{-6}	3.32×10^{-6}
	Eff. Factor	2.27×10^{5}	3.01×10^{5}
Count Rates:	$\dot{\gamma}_m$	7377/4	19089/4
South Col	$\dot{\gamma}_s$	30.74	79.53
	Eff	2.36×10^{-6}	6.12×10^{-6}
	Eff Factor	4.24×10^{5}	1.63×10^{5}
Avg.		3.26×10^{5}	2.32×10^{5}

Assembly J-5

Parts 001, 002, 008, 005 Base Rate = 8.041×10^{5} n/s

Moderator Thickness per 6 kg cell = 2.54 cm



Position	Ch. T-1	Eff. Factor	10^5 n/s	M	Ch. T-2	Eff. Factor	10^5 n/s	M
V 0.00	16600/12	3.26×10^{5}	75.18	9.35	23682/12	2.32×10^{5}	76.30	9.49
H 0.00	23.06				32.89			$\bar{M} = 9.42$

Assembly J-6: Pa to Pa 20.00 cm

Lateral Spacing: 0.69 fixed + 19.309 = 19.999 cm

Vertical Spacing: 0.442 fixed = 0.442 cm

Moderator Thickness per 6 kg cell = 2.54 cm

Base Rate = 16.081×10^{5} n/s

V	0.00	17246/10	3.42×10^{5}	98.29	6.11	25798/10	2.35×10^{5}	101.05	6.28
H	0.00	28.74				43.00			$\bar{M} = 6.20$

T/C's Room = 72 #3 = 82

Assembly J-7 : Pu to Pu = 15.000 cm

Lateral Spacing: 0.69 fixed + 14.308 = 14.998 cm

Vertical Spacing: 0.442 fixed = 0.442 cm

Moderator Thickness per 6 kg cell = 2.54 cm

Base Rate = 16.081×10^5 n/s

Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff Factor	10^5 n/s	M
V 0.00	18795/10	3.42×10^{-5}	107.15	6.66	26962/10	$2.35^- \times 10^{-5}$	105.61	6.57
H 0.00	31.33				44.94			$\bar{M} = 6.62$
A 15.00								

T/C's Room = 72.5 #2 = 87 #3 = 94

3-25-66

Assembly J-8 : Pu to Pu = 10.000 cm

Lateral Spacing: 0.69 fixed + 9.301 = 9.991 cm

Vertical Spacing: 0.442 fixed = 0.442 cm

Moderator Thickness per 6 kg cell = 2.54 cm

Base Rate = 16.081×10^5 n/s

V 0.00	11871/5	3.42×10^{-5}	135.33	8.42	17068/5	$2.35^- \times 10^{-5}$	133.69	8.31
H 0.00	39.57				56.89			$\bar{M} = 8.37$
A 15.00								

T/C's Room = 72.5 #2 = 97 #3 = 107

Assembly J-9 : Pu to Pu = 8.700 cm

Lateral Spacing: 0.69 fixed + 8.011 = 8.701 cm

Vertical Spacing: 0.442 fixed = 0.442 cm

Moderator Thickness per 6 kg cell = 2.54 cm

Base Rate = 16.081×10^5 n/s

Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff. Factor	10^5 n/s	M
V 0.00	13189/5	3.42×10^{-5}	150.24	9.35	20056/5	2.35×10^{-5}	157.10	9.77
H 0.00	43.96				66.85			$\bar{M} = 9.56$
A 15.00								

T/C's Room = 73 #2 = 82 #3 = 100

Assembly J-10: Pu to Pu = 6.123 cm (Min. Spacing)

Lateral Spacing: 0.69 fixed + 5.428 = 6.118 cm

Vertical Spacing: 0.442 fixed = 0.442 cm

Moderator Thickness per 6 kg cell = 2.54 cm

Base Rate = 16.081×10^{-5} n/s

V 0.00	27352/5	3.30×10^{-5}	300.86	18.71	41680/5	2.13×10^{-5}	295.64	18.38
H 0.00	91.17				138.8			$\bar{M} = 18.55$
A 15.00								

T/C's Room = 72.5 #2 = 97.5 #3 = 97.

Eff. Factor calculations for Assembly J-10

		T-1	T-2
Count Rates:	c/m	9495/5	24053/5
Moderator = 2.54 cm	c/s	31.65	80.18
Col. 1	Eff	2.43×10^{-6}	6.17×10^{-6}
	Eff Factor	4.12×10^{-5}	1.62×10^{-5}
Count Rates:	c/m	9733/5	23766/5
	c/s	32.44	79.22
Col. 2	Eff	2.50×10^{-6}	6.09×10^{-6}
	Eff Factor	4.00×10^{-5}	1.64×10^{-5}
Count Rates:	c/m	15372/5	15011/5
	c/s	51.24	50.04
Col. 3	Eff	3.94×10^{-6}	3.85×10^{-6}
	Eff Factor	2.54×10^{-5}	2.60×10^{-5}
Count Rates:	c/m	15405/5	14819/5
	c/s	51.35	49.40
Col. 4	Eff	3.95×10^{-6}	3.80×10^{-6}
	Eff Factor	2.53×10^{-5}	2.63×10^{-5}

Avg. Eff. Factors for Assembly J-10

T-1	T-2
3.30×10^{-5}	2.13×10^{-5}

Assembly J-10R: Pu to Pu 6.123 cm

Same Spacing as J-10
Large reflector added to vertical table

Moderator Thickness per 6 Kg cell = 2.548 cm

Base Rate = 16.081×10^{-5} n/s

Position	Cts T-1	Eff. Factor	10^{-5} n/s	M	Cts T-2	Eff. Factor	10^{-5} n/s	M
V 0.00	41455/5	3.30×10^{-5}	485.09	30.16	61169/5	2.13×10^{-5}	491.40	30.56
H 0.00	138.18				203.80			$\bar{M} = 30.36$
A 15.00								

T/C's Room = 72 #2 = 97 #3 = 97

Assembly J-10R': Pu to Pu 6.123 cm

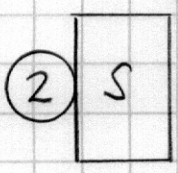
The large reflector was moved .5 in from the moderator. This was the only change made in J-10R. This should be a comparable

V 0.00	37282/5	3.30×10^{-5}	410.09	25.50	54930/5	2.13×10^{-5}	390.00	24.25
H 0.00	124.27				183.10			$\bar{M} = 24.88$
A 15.00								

T/C's Room = 73 #2 = 97.5 #3 = 97.5

3-28-66

Assembly K-1:

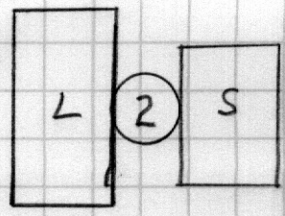


Parts 001, 002 Base Rate = 4.077×10^5 n/s

Moderator Thickness per 6 Kg cell = 1.27 cm

Position	Ck T-1	Eff. Factor	10^5 n/s	M	Ck T-2	Eff. Factor	10^5 n/s	M
V 0.00	8144/20	2.77×10^5	18.81	4.61	12403/20	1.83×10^5	18.92	4.64
H 0.00	6.79				10.34			$\bar{M} = 4.6$

Assembly K-2:



Parts 001, 002 Base Rate = 4.077×10^5 n/s

Moderator Thickness per 6 Kg cell = 1.27 cm

V 0.00	9120/20	2.70×10^5	20.52	5.03	13322/20	1.90×10^5	21.09	5.17
H 0.00	7.60				11.10			$\bar{M} = 5.1$

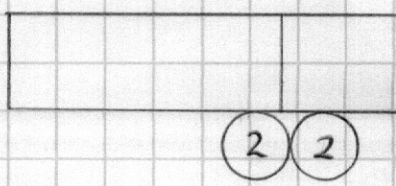
Assembly K-3:

Parts 001, 002

Moderator Thickness per 6 Kg cell = 1.27 cm

V 0.00	7209/20	2.84×10^5	17.07	4.19	11684/20	1.85×10^5	18.41	4.52
H 0.00	6.01				9.79			$\bar{M} = 4.4$

Assembly K-4:



Parts 001, 002, 004, 005 Base Rate = 8.041×10^5 n/s

Moderator Thickness per 6 Kg cell = 1.27 cm

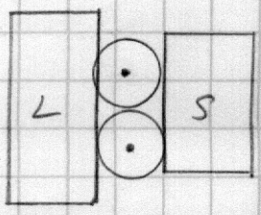
V 0.00	16406/10	2.24×10^5	61.25	7.62	4768/10	5.67×10^5	45.08	5.61
H 0.00	27.35				7.95			$\bar{M} = 6.62$

Eff. Factor Calculation for Assembly K-4

		T-1	T-2
Count Rates:	$\dot{g}_m$	17329/s	6759/s
West Col.	$\dot{g}_s$	57.73	22.53
	Eff.	4.44×10^{-6}	1.73×10^{-6}
	Eff. Factor	2.25×10^{5}	5.78×10^{5}
Count Rates:	$\dot{g}_m$	17462/s	7008/s
East Col.	$\dot{g}_s$	58.22	23.36
	Eff	4.48×10^{-6}	1.80×10^{-6}
	Eff. Factor	2.23×10^{5}	5.56×10^{5}
	Avg.	2.24×10^{5}	5.67×10^{5}

Assembly K-5:

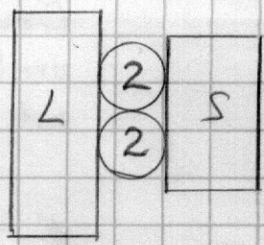
Eff. Factor Calculation for this assembly



		T-1	T-2
Count Rates:	$\dot{g}_m$	15773/s	13415/s
North Col.	$\dot{g}_s$	52.58	44.72
Moderator = 1.27cm	Eff	4.04×10^{-6}	3.44×10^{-6}
	Eff. Factor	2.48×10^{5}	2.91×10^{5}
Count Rates:	$\dot{g}_m$	9142/s	23183/s
South Col.	$\dot{g}_s$	30.47	77.28
	Eff	2.34×10^{-6}	5.95×10^{-6}
	Eff Factor	4.27×10^{5}	1.68×10^{5}
	Avg.	3.38×10^{5}	2.30×10^{5}

Parts 001, 002, 004, 005 Base Rate = 8.041×10^{5} n/s

Moderator Thickness per 6 Kg cell = 1.27cm



	Position	cts T-1	Eff. Factor	10^5 n/s	M	cts T-2	Eff. Factor	10^5 n/s	M
V	0.00	16758/10	3.38×10^{5}	94.40	11.74	25066/10	2.30×10^{5}	96.09	11.95
H	0.00	27.93				41.78		$\bar{M}$ =	11.86

3-29-66

Note*: Today we found our timer was off apprix. 40%. A check of the timer against a clock showed 3.00 min. on the timer against 1 min 48 sec. true time. We will try to determine when this first happened. We will re-run assembly I-8. Results of this run is on page 28. We will try to determine when we first experienced the problem. It appears to have occured about the time we went from the bare assemblies to the moderated ones.

A check was made with col. 1 of assembly I-8 with and without moderator. Col. 1 was the only col. on the table.

	T-1	T-2
Moderator = 3.81 cm Col. 1	9893/3	21111/3
No Moderator Col. 1	9865/3	21837/3

As shown on page 28 the re-run of assembly I-8 agreed with the first run on page 15. Since the timing error was in both the determination of the Eff. Factor and the assembly emission rate, the two canceled and therefore our data is good.

It appears the discrepancy due to this timing error occurred on 2-23-66 when we switched from bare to moderated. (Page 89 Vol. 2) This is verified by the fact the addition of a moderator does not change the Eff. Factor as shown above.

3-29-66 Note* (Other page)

Assembly I-8: Pu to Pu = 20.00 cm

Lateral Spacing: 0.69 fixed + 19.299 = 19.989 cm

Vertical Spacing: 0.442 fixed = 0.442 cm

Moderator Thickness per 6kg cell = 3.81cm

Base Rate = 16.081 $\times 10^5$ n/s

Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.00	16466/5	2.27×10^5	124.60	7.75	25842/5	1.41×10^5	121.46	7.55
H 0.00	54.89				86.14			$\bar{M}$ = 7.65
T/C's	Room = 72				#2 = 99		#3 = 99	

Eff. Factor Calculation for this array. (3.81 cm Moderator)

		T-1	T-2
Count Rates:	c/m	7788/3	22089/3
Col. 1	c/s	43.32	122.72
Moderator = 3.81cm	Eff	3.33×10^{-6}	9.44×10^{-6}
	Eff. Factor	3.00×10^5	1.06×10^5
Count Rates:	c/m	8305/3	22566/3
Col. 2	c/s	46.14	127.59
	Eff.	3.55×10^{-6}	9.81×10^{-6}
	Eff. Factor	2.82×10^5	1.02×10^5
Count Rates:	c/m	23724/5	21395/5
Col. 3	c/s	79.07	71.32
	Eff.	6.08×10^{-6}	5.49×10^{-6}
	Eff. Factor	1.65×10^5	1.82×10^5
Count Rates:	c/m	14701/3	13448/3
Col. 4	c/s	81.67	74.71
	Eff.	6.28×10^{-6}	5.75×10^{-6}
	Eff. Factor	1.59×10^5	1.78×10^5
	Avg.	2.27×10^5	1.41×10^5

Assembly K-6 : Pu to Pu 20.00 cm

Lateral Spacing : 0.69 fixed + 19.298 = 19.989 cm

Vertical Spacing : 0.442 fixed = 0.442 cm

Moderator Thickness per 6 Kg cell = 1.27 cm

Base Rate = 16.081×10^{-5} n/s

	Position	Ch T-1	Eff. Factor	10^{-5} n/s	M	Ch T-2	Eff. Factor	10^{-5} n/s	M
V	0.00	11766/5	2.87×10^{-5}	73.34	4.56	18774/5	1.22×10^{-5}	76.36	4.75
H	0.00	39.22				62.59			$\bar{M} = 4.66$

T/C's Room = 72.5 #2 = 100 #3 = 91

3-30-66

Assembly K-7 : Pu to Pu 15.00 cm

Lateral Spacing : 0.69 fixed + 14.303 = 14.993 cm

Vertical Spacing : 0.442 fixed = 0.442 cm

Moderator Thickness per 6 Kg cell = 1.27 cm

Base Rate = 16.081×10^{-5} n/s

	Position	Ch T-1	Eff. Factor	10^{-5} n/s	M	Ch T-2	Eff. Factor	10^{-5} n/s	M
V	0.00	25165/10	1.87×10^{-5}	78.43	4.88	38735/10	1.22×10^{-5}	78.76	4.9
H	0.00	41.94				64.56			$\bar{M} = 4.89$

T/C's Room = 73 #2 = 95 #3 = 91.5

Eff. Factor calculation for this assembly (K-7)

		T-1	T-2
Count Rates :	c/m	18096/5	36973/5
Col. 1	c/s	60.32	123.24
Moderator = 1.27 cm	Effi.	4.64×10^{-6}	9.48×10^{-6}
	Eff. Factor	2.16×10^{-5}	1.06×10^{-5}

		T-1	T-2
Count Rates : Col. 2 Moderator = 1.27 cm	γ_m	18355/s	37878/s
	γ_s	61.18	124.91
	Eff.	4.71×10^{-6}	9.61×10^{-6}
	Eff. Factor	2.12×10^{5}	1.08×10^{5}
Count Rates : Col. 3 Moderator = 1.27 cm	γ_m	24056/s	27565/s
	γ_s	80.19	91.88
	Eff.	6.17×10^{-6}	7.07×10^{-6}
	Eff. Factor	1.62×10^{5}	1.41×10^{5}
Count Rates : Col. 4 Moderator = 1.27 cm	γ_m	24996/s	28358/s
	γ_s	83.15	94.51
	Eff.	6.40×10^{-6}	7.27×10^{-6}
	Eff. Factor	1.56×10^{5}	1.38×10^{5}
	Avg.	1.87×10^{5}	1.22×10^{5}

Assembly K-8 : Pu to Pu 10.00 cm

Lateral Spacing : 0.69 fixed + 9.307 = 9.997 cm

Vertical Spacing : 0.492 fixed = 0.492 cm

Moderator Thickness per 6 Kg cell = 1.27 cm

Base Rate = 16.081×10^{5} n/s

Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff. Factor	10^5 n/s	M
V 0.00	13939/s	1.95×10^{5}	90.60	5.63	22133/s	1.21×10^{5}	89.27	5.55
H 0.00	46.46				73.78			$\bar{M} = 5.59$

T/C's Room = 73 #2 = 92 #3 = 92

Eff. Factor calculation for this assembly (K-8)

		T-1	T-2
Count Rates : Col. 1 Moderator = 1.27 cm	γ_m	17389/s	37395/s
	γ_s	57.96	124.65
	Eff.	4.46×10^{-6}	9.59×10^{-6}
	Eff. Factor	2.24×10^{5}	1.04×10^{5}

		T-1	T-2
Count Rates:	ϕ_m	17578/s	37888/s
Col. 2	ϕ_s	58.59	126.28
Moderator = 1.27cm	Eff	4.51×10^{-6}	9.71×10^{-6}
	Eff. Factor	2.22×10^{5}	1.03×10^{5}
Count Rates:	ϕ_m	23504/s	27864/s
Col. 3	ϕ_s	78.35	92.88
Moderator = 1.27cm	Eff	6.03×10^{-6}	7.14×10^{-6}
	Eff. Factor	1.66×10^{5}	1.40×10^{5}
Count Rates:	ϕ_m	23559/s	28410/s
Col. 4	ϕ_s	78.53	94.70
Moderator = 1.27cm	Eff	6.08×10^{-6}	7.28×10^{-6}
	Eff. Factor	1.66×10^{5}	1.37×10^{5}
	Avg.	1.95×10^{5}	1.21×10^{5}

Assembly K-9: Pu to Pu 8.709 cm

Lateral Spacing: 0.69 fixed + 8.019 = 8.709 cm

Vertical Spacing: 0.442 fixed = 0.442 cm

Moderator Thickness per 6 Kg cell = 1.27cm

Base Rate = 16.081×10^{5} n/s

Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff. Factor	10^5 n/s	M
V 0.00	14989/s	1.95×10^{5}	94.19	5.86	23807/s	1.21×10^{5}	96.03	5.97
H 0.00	48.30				79.36			$\bar{M} = 5.92$

T/c's Room = 72.5 #2 = 94 #3 = 92

4-1-66

Due to a bad preamp and amplifier, there has been some adjustment in the detectors. There will therefore be a change in our apparent eff. factors. Eff. Factors will be check for all assemblies so this will not have any effect on our data. We will now continue with our experiments.

Assembly K-10: Pu to Pu 6.123 cm

Lateral Spacing: 0.69 fixed + 5.425 = 6.115 cm

Vertical Spacing: 0.442 fixed = 0.442 cm

Moderator Thickness per 6kg cell = 1.27cm

Base Rate = 16.081×10^{-5} n/s

Position	Ch T-1	Eff. Factor	10^{-5} n/s	M	Ch T-2	Eff. Factor	10^{-5} n/s	M
V 0.00	22027/4	1.33×10^{-5}	122.07	7.59	28540/4	1.05×10^{-5}	124.87	7.77
H 0.00	91.78				118.92			$\bar{M} = 7.68$
T/C's		Room = 72.5			#2 = 89			#3 = 89

Eff. Factor calculation for this assembly (K-10)

		T-1	T-2
Count Rates: Col. 1	c/m	15137/3	26853/3
	c/s	84.09	149.18
	Eff.	6.47×10^{-6}	11.48×10^{-6}
	Eff. Factor	1.55×10^{-5}	$.871 \times 10^{-5}$
Count Rates: Col. 2	c/m	15205/3	27112/3
	c/s	84.47	150.62
	Eff.	6.50×10^{-6}	11.59×10^{-6}
	Eff. Factor	1.54×10^{-5}	$.863 \times 10^{-5}$
Count Rates: Col. 3	c/m	20986/3	18944/3
	c/s	116.37	105.24
	Eff	8.95×10^{-6}	8.10×10^{-6}
	Eff. Factor	1.12×10^{-5}	1.24×10^{-5}

		T-1	T-2
Count Rates: Col. 4	γ_n	20960/3	19391/3
	γ_s	116.44	107.76
	Eff.	8.96×10^{-6}	8.29×10^{-6}
	Eff. Factor	$1.12 \times 10^{5-}$	$1.21 \times 10^{5-}$
	Avg.	$1.33 \times 10^{5-}$	$1.05 \times 10^{5-}$

Assembly K-11 : Pu to Pu 3.606 cm

Lateral Spacing : 0.69 fixed + 2.916 = 3.606 cm

Vertical Spacing : 0.442 fixed = 0.442 cm

Moderator Thickness per 6 kg Cell = 1.27 cm

Base Rate = $16.081 \times 10^{5-}$ n/s

Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff. Factor	10^5 n/s	M
V 0.00	25338/2	$1.25 \times 10^{5-}$	315.34	19.61	38138/2	$.979 \times 10^{5-}$	311.11	19.35
H 0.00	244.45				317.78			M = 19.48

T/C's Room = 72.5° #2 = 95° #3 = 89

Eff. Factor calculation for this assembly (K-11)

		T-1	T-2
Count Rates: Col. 1	γ_n	26707/s	45458/s
	γ_s	89.02	151.65
	Eff.	6.85×10^{-6}	11.67×10^{-6}
	Eff. Factor	$1.46 \times 10^{5-}$	$.857 \times 10^{5-}$
Count Rates: Col. 2	γ_n	26993/s	45938/s
	γ_s	88.14	153.13
	Eff.	6.78×10^{-6}	11.78×10^{-6}
	Eff. Factor	$1.47 \times 10^{5-}$	$.849 \times 10^{5-}$
Count Rates: Col. 3	γ_n	37852/s	37980/s
	γ_s	116.17	116.60
	Eff	8.98×10^{-6}	8.97×10^{-6}
	Eff. Factor	$1.12 \times 10^{5-}$	$1.11 \times 10^{5-}$

		T-1	T-2
Count Rates : Col. 4	ϕ_n	35320/s	35620/s
	ϕ_s	117.73	118.73
	Eff.	9.06×10^{-6}	9.13×10^{-6}
	Eff. Factor	1.10×10^{5}	1.10×10^{5}
	Avg	1.29×10^{5}	$.979 \times 10^{5}$

Assembly K-11R : Pu to Pu 3.606 cm

Same spacing as K-11

Large reflector added to the horizontal table.

Moderator Thickness per 6 kg cell = 1.27 cm

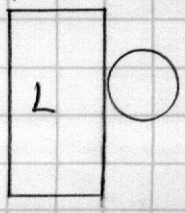
Base Rate = 16.081×10^{5} n/s

	Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff. Factor	10^5 n/s	M
V	0.00	39301	1.29×10^{5}	844.95	52.575-0140		$.979 \times 10^{5}$	818.11	50.87
H	0.00	655.				83566			$\bar{M}$ = 51.70
	T/C's	Room = 72			#2 = 96		#3 = 88		

4-6-66 3^3 Array

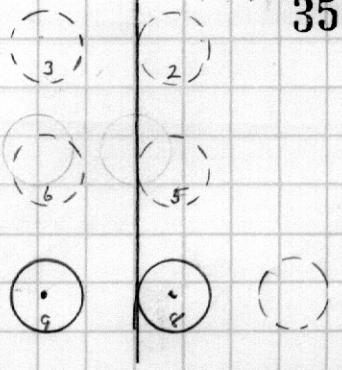
The safety experiments will be done for the 3^3 array as described in Assembly Procedure No. 7.

Eff. Factor calculation for the safety experiment.

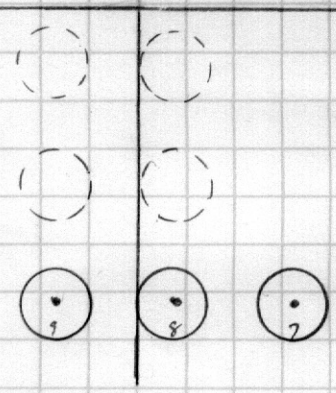


		T-1	T-2
Count Rates :	ϕ_n	11914/2	15200/2
	ϕ_s	99.28	126.67
	Eff.	7.64×10^{-6}	9.74×10^{-6}
	Eff. Factor	1.31×10^{5}	1.03×10^{5}

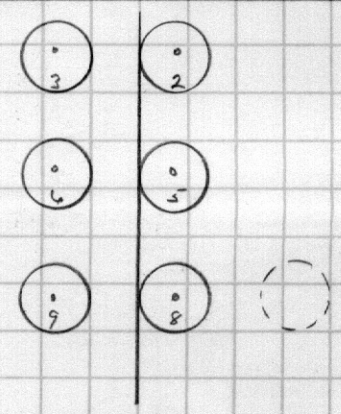
		T-1	T-2
Count Rates: Col. 8	c/m	13150/2	15517/2
	c/s	109.58	129.31
	Eff.	8.43×10^{-6}	9.95×10^{-6}
	Eff. Factor	1.19×10^{5}	1.01×10^{5}
Count Rates Col. 9	c/m	13102/2	15389/2
	c/s	109.18	128.24
	Eff.	8.40×10^{-6}	9.86×10^{-6}
	Eff. Factor	1.19×10^{5}	1.01×10^{5}
	Avg.	1.19×10^{5}	1.01×10^{5}



Count Rates Col. 7	c/m	13150/2	15517/2
	c/s		
	Eff.		
	Eff. Factor	1.19×10^{5}	1.01×10^{5}
Count Rates Col. 8	c/m	13102/2	15389/2
	c/s		
	Eff.		
	Eff. Factor	1.19×10^{5}	1.01×10^{5}
Count Rates Col. 9	c/m	13388/2	15769/2
	c/s	111.53	128.91
	Eff.	8.58×10^{-6}	9.92×10^{-6}
	Eff. Factor	1.17×10^{5}	1.01×10^{5}
	Avg.	1.18×10^{5}	1.01×10^{5}



Count Rate: Col. 2	c/m	11069/2	17211/2
	c/s	92.24	143.43
	Eff.	7.10×10^{-6}	11.03×10^{-6}
	Eff. Factor	1.41×10^{5}	$.907 \times 10^{5}$
Count Rates: Col. 3	c/m	11025/2	17345/2
	c/s		
	Eff.		
	Eff. Factor	1.41×10^{5}	$.907 \times 10^{5}$

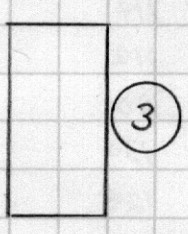


		T-1	T-2
Count Rates: Col. 5	c/m	12069/2	16184/2
	c/s	100.58	134.87
	Eff.	7.74×10^{-6}	10.38×10^{-6}
	Eff. Factor	1.29×10^{5}	$.963 \times 10^{5}$
Count Rates: Col. 6	c/m	12287/2	16273/2
	c/s	102.39	135.61
	Eff.	7.88×10^{-6}	10.43×10^{-6}
	Eff. Factor	1.27×10^{5}	$.959 \times 10^{5}$
Count Rates: Col. 8	c/m	13248/2	14999/2
	c/s	110.40	124.99
	Eff.	8.49×10^{-6}	9.61×10^{-6}
	Eff. Factor	1.18×10^{5}	1.04×10^{5}
Count Rates: Col. 9	c/m	13369/2	14922/2
	c/s	111.41	124.35
	Eff	8.57×10^{-6}	9.57×10^{-6}
	Eff. Factor	1.17×10^{5}	1.04×10^{5}
	Avg.	1.29×10^{5}	$.964 \times 10^{5}$

4-7-66

Assembly L-1: Pu to Pu 2.392 cm

Parts 001, 002, 004 Base Rate = 6.067×10^{5} n/s



Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.00	9253/10	1.31×10^{5}	20.29	3.34	12386/10	1.03×10^{5}	21.26	3.50
H 0.00	15.49				20.64			$\bar{M} = 3.42$

T/C's Room = 72 #2 = 109 (002) #3 = 90 (004)

Assembly L-2: Pu to Pu 2.392 cm

Parts 001, 002, 004 Base Rate = 6.067×10^{5} n/s

3

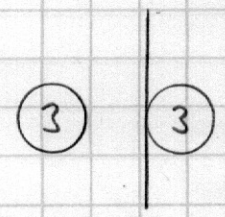
V 0.00	9038/10	1.29×10^{5}	19.43	3.20	12319/10	$.963 \times 10^{5}$	19.77	3.26	
H 0.00	15.06				20.53				$\bar{M} = 3.23$

T/C's Room = 72 #2 = 107.5 #3 = 90

Part #	Base Rate
001, 002, 004, 005, 007, 008, 009	16.081 $\times 10^{-5}$
126	2.08 $\times 10^{-5}$
115	2.07
127	2.06
119	2.10
123	2.11
114	2.07
112	2.09
110	2.03
130	2.14
124	2.15
	~~22.508 $\times 10^{-5}$~~ ~~NO, NO, NO~~
	36.981 $\times 10^{-5}$

Assembly L-3 : Pu to Pu = 2.397 cm

Parts 001, 002, 004, 005, 006, 007
Base Rate = 12.044 $\times 10^5$ n/s



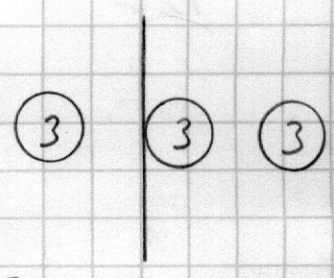
Position	Cts-T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.00	12857/5	1.19×10^5	50.98	4.23	18677/5	1.01×10^5	49.41	4.10
H 0.00	42.84				48.92			$\bar{M}$ = 4.17

T/C's Room = 72.5 #2 = 95 #3 = 97

Assembly L-4 : Pu to Pu = 2.397 cm

Parts 001, 002, 004, 005, 006, 007, 008, 009, 126

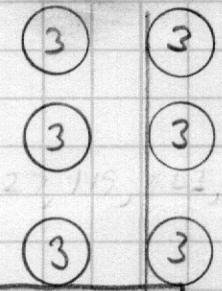
Base Rate = 18.161 $\times 10^5$ n/s



V 0.00	22533/5	1.18×10^5	88.63	4.88	25536/5	1.01×10^5	86.07	4.74
H 0.00	75.11				85.22			$\bar{M}$ = 4.81

T/C's Room = 73 #2 = 93.5 #3 = 96

Assembly L-5 : Pu to Pu = 2.397 cm



Parts 001, 002, 004, 005, 006, 007, 008, 009, 126, 116, 127, 119, 123, 114, 112, 110, 130, 124

Base Rate = ~~22.508~~ 36.981 $\times 10^5$ n/s

Correction factor = .609

V 0.00	15003	1.29×10^5	322.56	~~14.33~~ 8.72	19585	$.969 \times 10^5$	316.29	~~14.05~~ 8.56
H 3.374	250.05				326.41			$\bar{M}$ = ~~14.19~~ 8.64

~~T~~/C's Room = 73 #2 = 97 #3 = 98.5

V 0.00	26517	1.29×10^5	570.12	~~36.33~~ 15.43	32652	$.969 \times 10^5$	562.85	~~36.01~~ 15.23
H 1.100	491.95				580.86			

T/C's Room = 73 #2 = 96.0 #3 = 97.5

V 0.00	55803	1.29×10^5	1199.76	~~53.50~~ 32.46	72156	$.969 \times 10^5$	1165.32	~~51.77~~ 31.53
H 0.00	930.05				1202.60			$\bar{M}$ = ~~52.67~~ 31.99

T/C's Room = 73 #2 = 96.0 #3 = 97.5

We will have to go to 2.6 cm in the X, Y direction and leave the Z = 2.4 cm and re-evaluate the 6 col. safety measurements.

Part #	Base Rate
128	2.13×10^{-5}

If this assembly has a mult. less than 10 then we will use a min. of 2.6 cm for safety in the x, y, and z directions.

4-11-66

Assembly L-6 :

Lateral Spacing: 0.69 fixed + 1.908 = 2.598 cm

Vertical Spacing: = 2.397 cm

Parts 001, 002, 008, 005, 006, 007, 008, 009, 126, 115, 127, 119, 123, 114, 112, 110, 130, 128

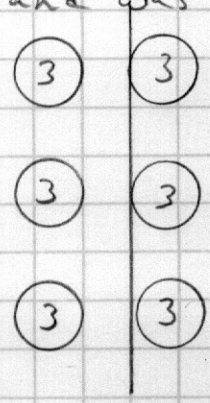
Base Rate = ~~22.808~~ 36.981 $\times 10^5$ n/s

Correction factor = .609

	Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff Factor	10^5 n/s	M	
V	0.00	9368	1.29×10^{-5}	201.41	~~8.95~~ 5.45	11757	$.969 \times 10^{-5}$	189.88	~~5.19~~ 5.30	~~8.44~~
H	9.529	156.13				195.95			$\bar{M}$ = ~~8.70~~	
	T/C's	Room = 72.5				#2 = 108			#3 = 96	
V	0.00	14363	1.29×10^{-5}	308.80	~~13.72~~	17857	$.969 \times 10^{-5}$	288.38	~~12.81~~	
H	3.374	239.38				297.61			$\bar{M}$ = ~~13.27~~	
	T/C's	R = 73				#2 = 102			#3 = 92	8.08
V	0.00	25263	1.29×10^{-5}	543.15	~~24.13~~	31587	$.969 \times 10^{-5}$	510.13	~~22.66~~	
H	0.761	421.05				526.45			$\bar{M}$ =	
	T/C's	R = 73				#2 = 103			#3 = 94	
V	0.00	36788	1.29×10^{-5}	790.94	~~35.14~~	46181	$.969 \times 10^{-5}$	745.17	~~33.11~~	
H	0.00	613.13				769.01			$\bar{M}$ = ~~38.15~~	
	T/C's	R = 73				#2 = 103			#3 = 95	20.79

Part #	Base Rate
128	2.13×10^{-5}
007	1.980

When we unloaded assembly 2-6 we found the top of can #007 was expanded and the can was hotter to touch than normal. We put it in its rack can and after a few minutes it had cooled and was not as expanded as before.



Assembly 2-7: Pu to Pu = 2.600 cm

Lateral Spacing: 0.69 fixed + 1.908 = 2.598 cm

Vertical Spacing: 1.066 fixed + 1.532 = 2.598 cm

Parts: 001, 002, 004, 005, 006, 008, 009, 126, 115; 127, 119, 123, 118, 112, 110, 130, 128, 128*

* Part # 007 was replaced by #128

Base Rate = ~~22.658~~ 36.981 X 10^5 n/s

Conection factor = .609

Position	Cts T-1	Eff Factor	10^5 n/s	M	Cts T-2	Eff Factor	10^5 n/s	M
V 0.00	9137	1.29×10^{-5}	196.44	~~8.67~~	11141	$.969 \times 10^{-5}$	179.97	~~7.94~~
H 9.529	152.28				185.73		$\bar{M}$ =	~~8.31~~ 5.06
T/C's	R = 73				#2 = 100		#3 = 100	
V 0.00	19242	1.29×10^{-5}	413.70	~~18.26~~	23583	$.969 \times 10^{-5}$	380.87	~~16.81~~
H 1.273	320.70				393.05		$\bar{M}$ =	~~17.54~~ 10.68
T/C's	R = 73				#2 = 108		#3 = 108	
V 0.00	30530	1.29×10^{-5}	656.39	~~28.97~~	37838	$.969 \times 10^{-5}$	611.08	~~26.97~~
H 0.00	508.83				630.63		$\bar{M}$ =	~~22.97~~ 17.03
T/C's	R = 73				#2 = 109		#3 = 89	

4-12-66

Assembly 2-8:

Lateral Spacing: 0.69 fixed + 2.710 = 3.400 cm

Vertical Spacing: 1.066 fixed + 1.532 = 2.598 cm

Parts: Same as 2-7

Base Rate = ~~22.658~~ 36.981 X 10^5 n/s

Correction factor = .609

Position	Ch-T-1	Eff. Factor	10^5 Y/s	M	Ch T-2	Eff. Factor	10^5 Y/s	M
V 0.00	8059	1.29×10^{-5}	173.27	~~2.65~~	9959	$.969 \times 10^{-5}$	160.83	~~2.70~~
H 9.522	134.32				165.98			$\bar{M} = $ ~~2.38~~ 4.49

T/C's Room = 73 #2 = 120* (Top can)

* While changing the bases, the cols. were parked on one table out of the air stream of the fan. After about 45 min. in this location the Temp. of the top part was up to 123°F.

V 0.00	16103	1.29×10^{-5}	344.21	~~15.28~~	20237	$.968 \times 10^{-5}$	326.82	~~14.42~~
H 0.00	268.38				337.28			$\bar{M} = $ ~~14.85~~ 9.04

T/C's Room = 73 #2 = 116

A Can #007 was placed in the top position of a col. and placed on the H. table out of the fan air stream. It reached a Temp. of 119°F in about 2 hours. At this time it was measured to determine its expansion. The depth of the can was ~20 m.ils above its dimension as measured when the parts were first received. The part was placed back in its heat sink and will be measured again when it cools.

Measured to be about 0.045 in. bigger than when measured at the beginning.

4/11/46 $\left[\frac{2}{3} \times 3^3\right]$ STS versus 1/M

⊙ x, y changes (z constant)

△ z changes (x, y constant)

$\Delta(x, y) = \frac{0.05\,\Delta(\frac{1}{M})}{0.64 \text{ cm}} = 0.0781 \; \Delta(\frac{1}{M})/\text{cm}$ (8k/cm)

If $\Delta(x) = \Delta(y) = 0.0391$ 8k/cm

$\Delta(z) = \frac{0.05\,\Delta(\frac{1}{M})}{0.41 \text{ cm}} = 0.122$ 8k/cm

1/M

0.1 M = 10

0.05

M = 100

Corrected

Corrected

3.25 cm Equated STS$_c$ for 20% larger than value

Equated STS$_c$ for equal x, y, z. 2.7 cm

2.0 2.13 cm STS$_c$ for 2×3×3 2.5 3.0 3.4 3.5

Lattice Spacing (STS)

358-10½ MADE IN U.S.A. 20 X 20 TO THE INCH KEUFFEL & ESSER CO.

Assembly L-9 : Pu to Pu = 3.400 cm

Lateral Spacing : 0.69 fixed + 2.710 = 3.400 cm

Vertical Spacing : 1.066 fixed + 2.334 = 3.400 cm

Parts : Same as L-7

Base Rate : ~~22.658~~ 36.981 $\times 10^{-5}$ n/s

Connection factor = .609

(3) (3)
(3) (3)
(3) (3)

Position	Ch 7 T-1	Eff Factor	10^5 n/s	M	Ch 7 T-2	Eff Factor	10^5 n/s	M
V 0.00	7190	1.29×10^{-5}	154.58	~~6.82~~	8871	$.969\times10^{-5}$	193.27	~~6.52~~
H ~~9.524~~	119.83				147.85			$\bar{M}$ = ~~6.67~~
T/C's	Room = 73				#2 = 95			4.00
V 0.00	12095	1.29×10^{-5}	260.04	~~11.48~~	14889	$.969\times10^{-5}$	240.46	~~10.61~~
H 0.00	201.54				248.15			$\bar{M}$ = ~~11.05~~
T/C's	Room = 73				#2 = 93.5			6.73

As shown by the graph of spacing vs. 1/M we have chosen a min. spacing for 2/3 of the 3^3 array of 3.500 cm.

Loading Sequence of 3^3 ~~Array~~

Part #	Base Rate		Tube No.
115	2.07×10^{-5}	Bottom	
127	2.06		1
119	2.10	Top	
123	2.11	Bottom	
114	2.07		2
001	2.03	Top	
002	2.05	Bottom	
126	2.08		3
004	1.99	Top	
005	1.97	Bottom	
112	2.09		4
110	2.03	Top	
130	2.14	Bottom	
124	2.15		5
128	2.13	Top	
122	2.09	Bottom	
102	2.09		6
098	2.02	Top	
118	2.07	Bottom	
117	2.06		7
006	2.02	Top	
008	2.01	Bottom	
009	2.03		8
100	2.10	Top	
113	2.05	Bottom	
121	2.07		9
125	2.10	Top	
	55.78×10^{-5}		

4-13-66

We will now begin the 3^3 array.

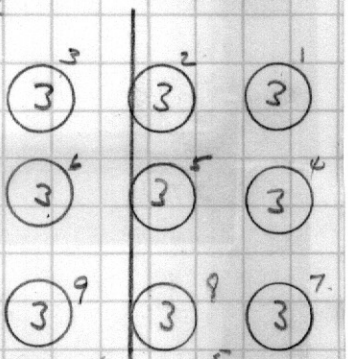
Assembly L-10: Pu to Pu = 8.000 cm

Lateral Spacing: 0.69 fixed + 7.310 = 8.000 cm

Vertical Spacing: 1.066 fixed + 6.934 = 8.000 cm

Parts: As shown on other page

Base Rate = 55.78×10^5 n/s



Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff. Factor	10^5 n/s	M
V 0.00	8028	1.29×10^5	172.60	3.09	10293	$.969 \times 10^5$	166.23	2.98
H 9.529	133.80				171.53			$\bar{M} = 3.03$
T/C's	Room = 73		#2 = 107			#3 = 109		
V 0.00	8567	1.29×10^5	184.19	3.30	10965	$.969 \times 10^5$	177.08	3.18
H 0.00	142.78				182.75			$\bar{M} = 3.22$
T/C's	R = 73		#2 = 100			#3 = 100		

Assembly L-11: Pu to Pu = 6.000 cm

Lateral Spacing: 0.69 fixed + 5.319 = 6.009 cm

Vertical Spacing: 1.066 fixed + 4.934 = 6.000 cm

Parts: Same as L-10

Base Rate = 55.78×10^5 n/s

1/60 f19

1/60 f19

1/60 f32 4/14/66

Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.00	9678	1.29×10^5	208.08	3.87	12310	$.969 \times 10^5$	198.80	3.56
H 9.529	161.30				205.16			$\bar{M} = 3.72$
T/C's		Room = 73				#2 = 109		#3 = 105
V 0.00	11141	1.29×10^5	239.53	4.29	14317	$.969 \times 10^5$	231.21	4.15
H 0.00	185.68				238.61			$\bar{M} = 4.22$
T/C's		Room = 73				#2 = 102		#3 = 98

4-14-66

Assembly L-12 : Pu to Pu = 4.000 cm

Lateral Spacing: 0.69 fixed + 3.310 = 4.000 cm

Vertical Spacing: 0.086 fixed + 3.915 = 4.001 cm

Parts : Same as L-10

Base Rate = 55.78×10^5 n/s

V 0.00	15185	1.29×10^5	326.4	5.84	18985	0.969×10^5	306.6	5.50
H 9.529	25-30				316.4			
T/C's Room 73						#2 = 97		#3 = 103
V 0.00	24888	1.29×10^5	535.1	9.59	30829	0.969×10^5	497.9	8.93
H 0.00	414.8				513.8		$\bar{M}$ =	9.26
	Room 72					#2 = 94		#3 96

4-15-66

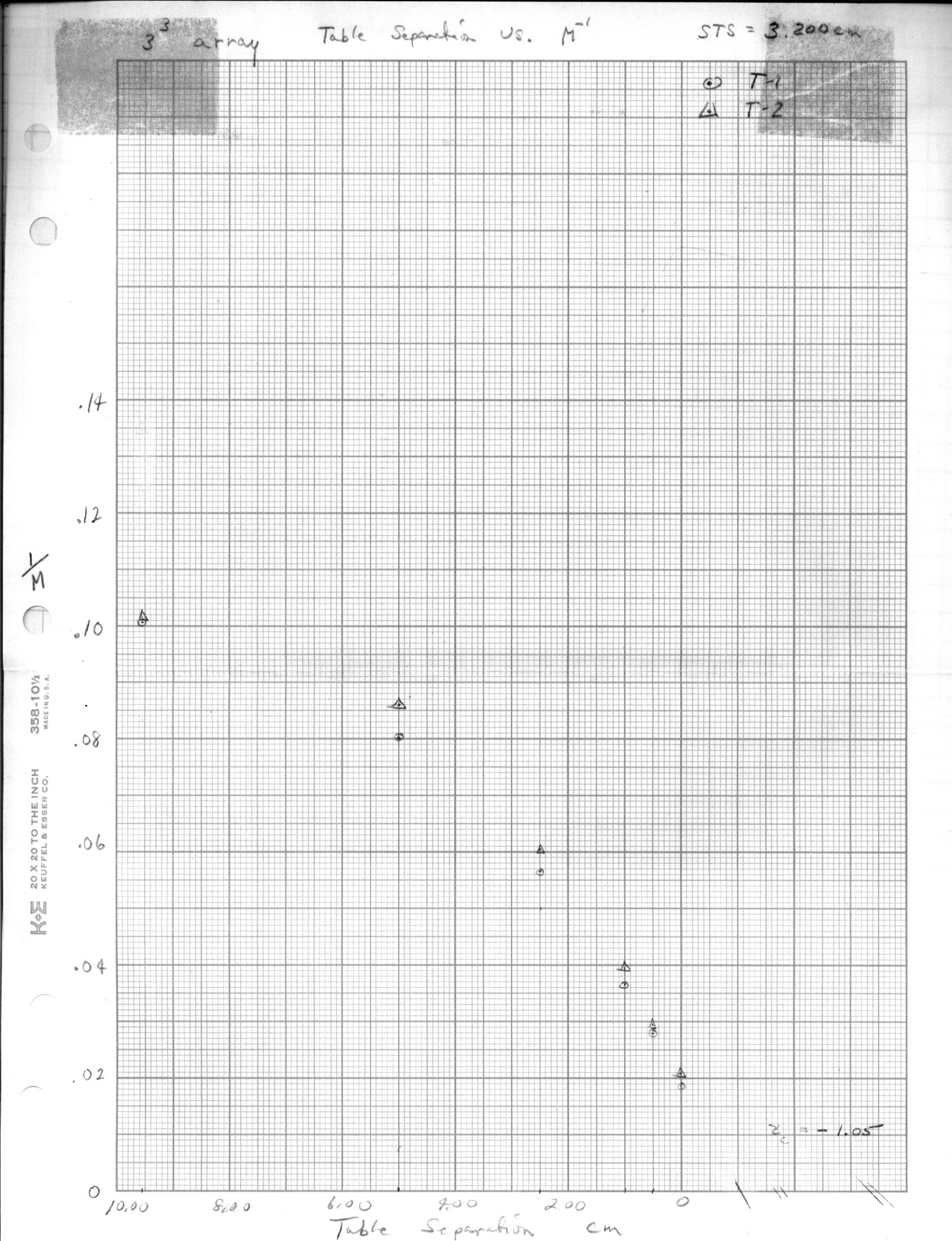
Assembly L-13 : Pu to Pu = 3.900 cm

Lateral Spacing : 0.69 fixed + 2.71 = 3.400 cm

Vertical Spacing : 1.066 fixed + 2.334 = 3.400 cm

Parts : Same as L-10

Base Rate = 55.78×10^5 n/s


3^3 array
Table Separation vs. M^{-1}
STS = 3.200 cm
T-1
T-2
.14
.12
1/M
.10
.08
.06
.04
.02
0
10.00
8.00
6.00
4.00
2.00
0
Table Separation cm
z_c = + 1.05
358-10½
MADE IN U.S.A.
20 X 20 TO THE INCH
KEUFFEL & ESSER CO.

Position	Ch T-1	Eff. Factor	10^6 n/s	M	Ch T-2	Eff. Factor	10^6 n/s	
✓ V 0.00	20893	1.29×10^{-5}	449.19	8.05	25624	0.969×10^{-5}	413.82	7.42
H 9.54	348.21				427.06			$\bar{M} = 7.74$
A 15.00								
T/C's	Room = 72.5				#2 = 114 (Top)		#3 = 105 (M. Sec.)	
V 0.00	41705	1.29×10^{-5}	896.65	16.07	51478	0.969×10^{-5}	831.36	14.90
H 1.149	695.08				857.96			$\bar{M} = 15.49$
A 15.00								
T/C's	Room = 72				#2 = 108		#3 = 98	
V 0.00	58839	1.29×10^{-5}	1265.09	22.68	71507	0.969×10^{-5}	1154.83	20.70
H 0.00	980.65				1191.78			$\bar{M} = 21.69$
A 15.00								
T/C's	Room = 72				#2 = 107		#3 = 97	
V 0.00	64498	1.29×10^{-5}	1386.70	24.86	75048	0.969×10^{-5}	1212.03	21.73
H 0.00	1074.96				1250.80			$\bar{M} = 23.30$
A 0.00								
T/C's	Room = 72				#2 = 103		#3 = 95	

4/18/66

Assembly L-14: Pu to Pu = 3.200 cm

Lateral spacing: 0.690 cm fuel + 2.510 cm = 3.200 cm

Vertical spacing: 0.086 cm fuel + 3.115 cm = 3.201 cm

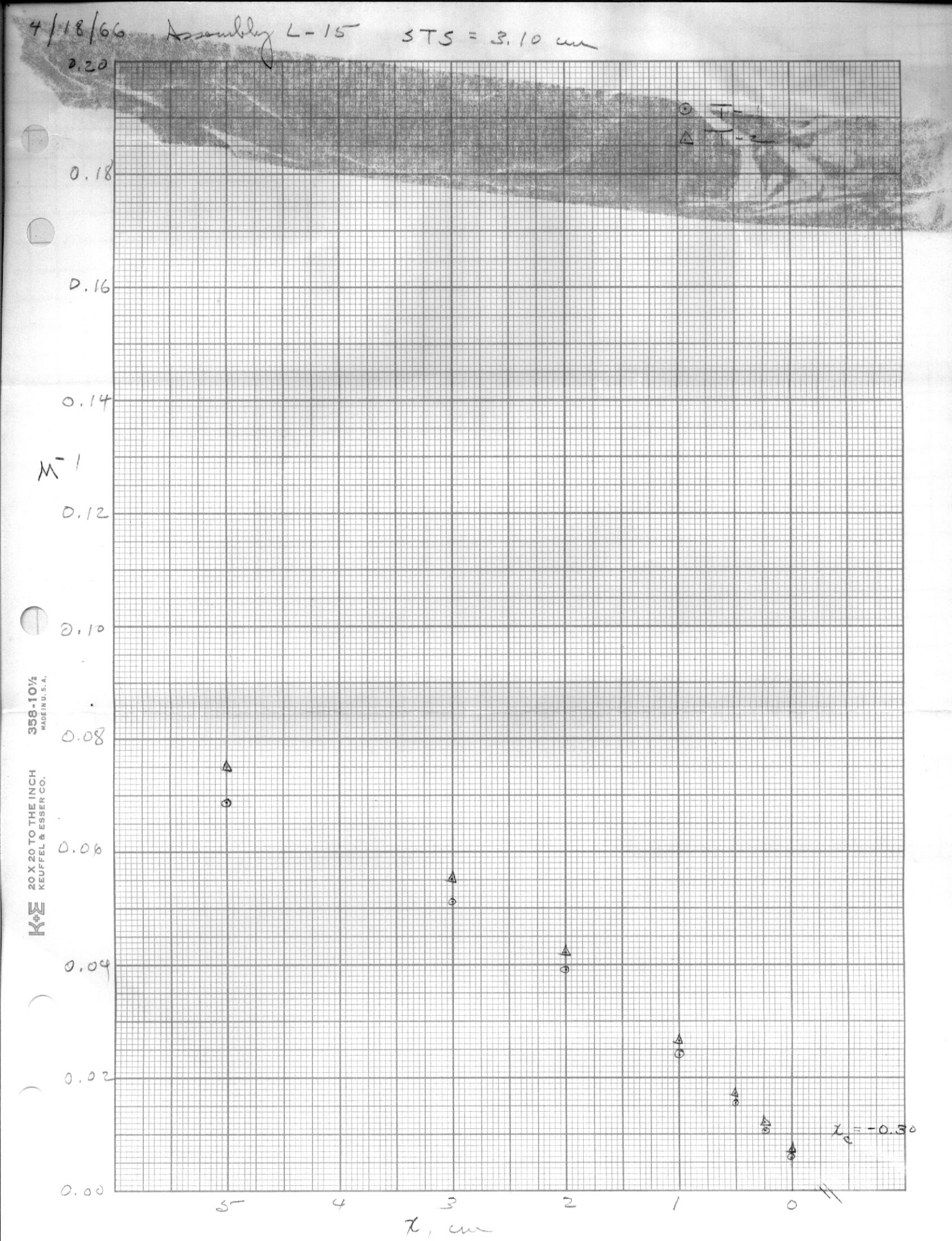
Partisans as L-10

Base rate: 55.78×10^5 n/sec

V	0.00	24579	1.29×10^{-5}	528.5	9.47	31122	0.969×10^{-5}	502.6	9.01
H	9.54	409.7				518.7			
A	15.00								
V	0.00	32298	1.29×10^{-5}	694.4	12.45	40350	0.969×10^{-5}	651.7	11.68
N	5.001	538.3				672.5			
A	15.00								

T/C's Room 72°F #2 - 87°F #3 - 96°F

4/18/66 Assembly L-15 STS = 3.10 cm



358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH KEUFFEL & ESSER CO.

Position	C to T-1	Eff Factor	10^5 n/s	M	C to T-2	Eff Factor	10^5 n/s	M
V 0.00	45803	1.29×10^5	984.8	17.66	57053	0.969×10^5	921.4	16.52
H 2.496	763.4				950.9			
A 15.00								

T/C's Room - 72°F #2 - 87°F #3 - 94°F

V 0.00	71353	1.29×10^5	1534	27.50	87304	0.969×10^5	1410	25.28
H 1.001	1189				1455			
A 15:00								

T/C's Room - 72°F #2 - 85°F #3 - 93°F

V 0.00	92584	1.29×10^5	1990	35.68	113780	0.969×10^5	1896	33.99
H 0.500	1543							
A 15.00								

T/C's Room 72°F #2 - 85°F #3 - 92°F

V 0.00	138985	1.29×10^5	2988	53.57	166488	0.969×10^5	2689	48.21
H 0.002	2316				2775		$\bar{M} = 50.9$	
A 15.00								

T/C's Room - 72 °F #2 - 85 °F #3 - 93 °F

Assembly L-15: STS = 3.100 cm Pu to Pu

Lateral spacing: 0.690 fuel + 2.405 = 3.095 cm

Vertical spacing: 0.086 fuel + 3.015 = 3.101 cm

Parts: same as L-10

Base rate: 55.78×10^5 n/s

V 0.00	27672	1.29×10^5	594.9	10.67	33860	0.969×10^5	546.8	9.80
H 9.50	461.2				564.3			
A 15.00								

T/C's Room 71°F #2 - 99°F #3 - 95°F

V 0.00	37811	1.29×10^5	813.0	14.58	45996	0.969×10^5	742.8	13.32
H 5.00	630.2				766.6			
A 15.00								

T/C's Room 72°F #2 - 96°F #3 - 93°F

55.78×10^5

Position	cts T-1	Eff factor	10^5 n/s	M	cts T-2	Eff factor	10^5 n/s	M
V 0.00	50900	1.29×10^5	1094	19.61	62618	0.969×10^5	1012	18.14
H 3.00	848.3				1044			
A 15.00								

T/C's Room 71 #2 - 95 #3 - 91°F

V 0.00	67231	1.29×10^5	1446	25.92	81617	0.969×10^5	1318	23.63
H 2.00	1121				1360			
A 15.00								

T/C's Room -72 #2 - 95 #3 - 91°F

V 0.00	107951	1.29×10^5	2321	41.61	130120	0.969×10^5	2102	37.68
H 1.00	1799				2169			
A 15.00								

T/C's Room - 72 #2 - 95 #3 - 91°F

V 0.00	167688	1.29×10^5	3606	64.65	198916	0.969×10^5	3212	57.58
H 0.499	2795				3315			
A 15.00								

T/C's Room - 72 #2 - 95 #3 - 91°F

V 0.00	240999	1.29×10^5	5182	92.90	279588	0.969×10^5	4516	80.96
N 0.251	4017				4660			
A 15.00								

T/C's Room - 72 #2 - 95 #3 - 91°F

V 0.00	433349	1.29×10^5	9316	167.0	488501	0.969×10^5	7890	141.4
H -0.006	7222		0.00598		8142			0.00707
A 15.00							$\bar{M}$ =	

T/C's Room - 72 #2 - 94 #3 - 91°F

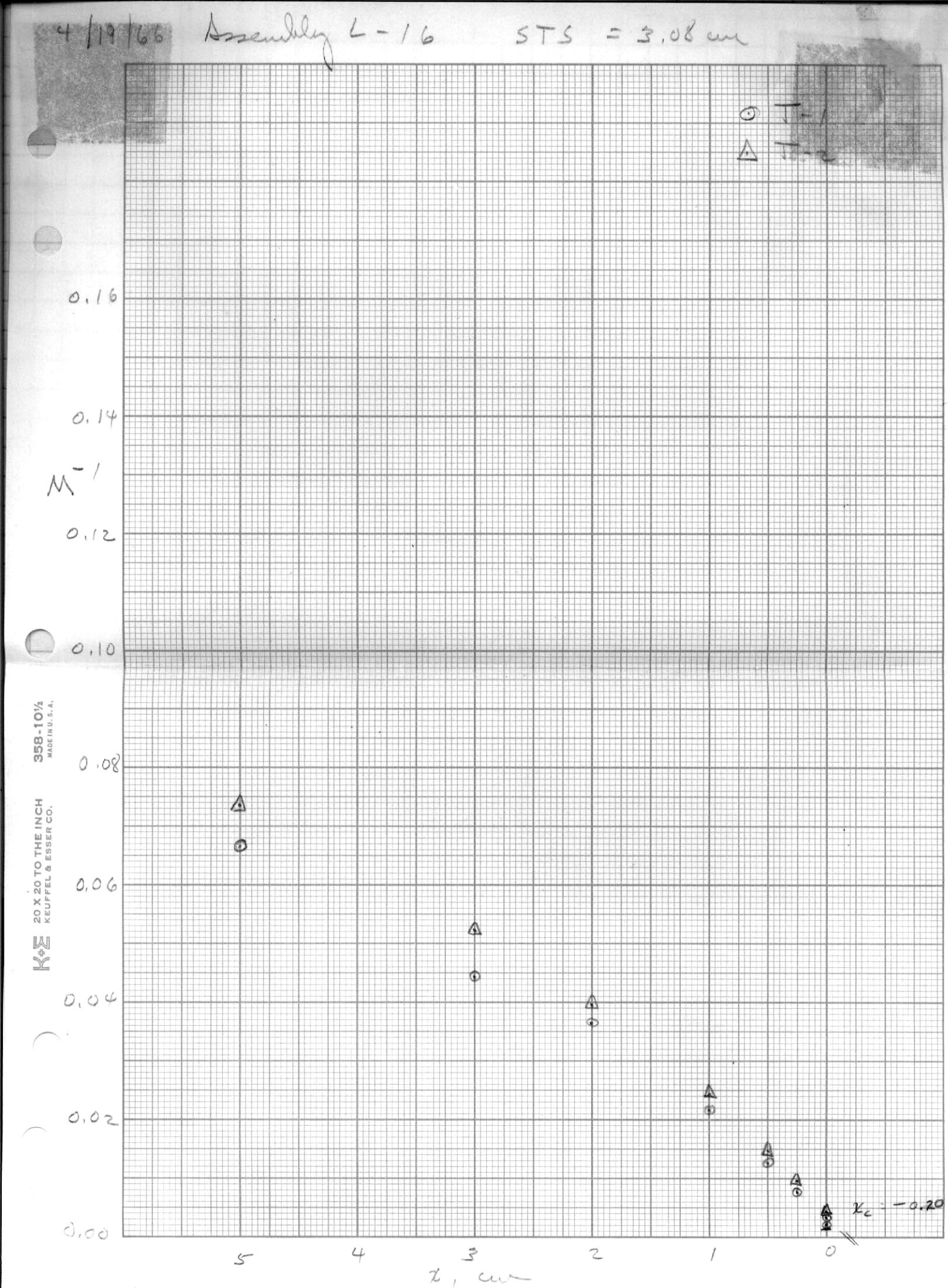
Run in control element

V 0.00	593129	1.29×10^5	12752	228.6	651569	0.969×10^5	10522	188.6
H -0.006	9885		0.00437		10859			0.00530
A 0.00								

$\rho\Delta k \sim$ 0.00161 0.00177

or integral worth of control element $\sim \frac{0.00169}{0.0019} = 0.89\$$

4/19/66 Assembly L-16 STS = 3.08 cm



358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH KEUFFEL & ESSER CO.

Assembly L-16: Pu to Pu 3.080 cm

Lateral spacing: 0.690 fixed + 2.390 = 3.080 cm

Vertical spacing: 0.086 fixed + 2.995 = 3.081 cm

Parts: same as for L-10

Base rate: 55.78×10^5 n/s

Position	to T-1	Eff factor	10^5 n/s	M	to T-2	Eff factor	10^5 n/s	M
V 0.00	27772	1.29×10^5	597.09	10.70	34510	0.969×10^5	557.33	9.99
H 9.520	462.86				575.16			$\bar{M}$ = 10.35
A 15.00								
T/C's	Room - 71				#2 - 96		#3 - 97	
V 0.00	38916	1.29×10^5	836.69	15.00	47005	0.969×10^5	759.12	13.61
H 5.002	648.60				783.41			$\bar{M}$ = 14.31
A 15.00								
T/C's	Room = 72				#2 = 95		#3 = 95	
V 0.000	58442	1.29×10^5	1256.50	22.53	66109	0.969×10^5	1067.65	19.14
H 2.998	974.03				1101.81			$\bar{M}$ = 20.84
A 15.00								
T/C's	Room = 72.5				# 2 = 94.5		#3 = 94.5	
V 0.00	71176	1.29×10^5	1530.28	27.43	86904	0.969×10^5	1403.50	25.16
H 2.00	1186.26				1448.40			$\bar{M}$ = 26.30
A 15.00								
T/C's	Room = 73				#2 = 94		#3 = 94	
V 0.00	119429	1.29×10^5	2567.62	46.03	143389	0.969×10^5	2315.72	41.52
H 1.00	1990.4				2389.8			$\bar{M}$ = 42.78
A 15.00								
T/C's	Room = 73				#2 = 93		#3 = 93	
V 0.00	200371	1.29×10^5	4307.96	77.23	232044	0.969×10^5	3747.51	67.18
H 0.501	3339.5				3867.4			$\bar{M}$ = 72.21
A 15.00								
T/C's	Room = 73				#2 = 93		#3 = 93	

* Part # 121 appears to be slightly enlarged. The heat sink rocks on the top of the can. The difference this expansion made could be seen in checking the vertical dimension.

Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff. Factor	10^5 n/s	M
V 0.00	329720	1.29×10^{-5}	7088.94	127.09	359163	0.969×10^{-5}	5800.43	103.99
H 0.250	5495.3				5986.0			$\bar{M} = 115.54$
A 15.00								

T/C's Room = 73 #2 = 92.5 #3 = 92.5

V 0.00	776209	1.29×10^{-5}	16688.97	299.18	811731	0.969×10^{-5}	13109.41	235.01
H 0.00	12936.8				13528.8			$\bar{M} = 267.10$
A 15.00								

T/C's Room = 72 #2 = 92. #3 = 92.

Run Actuator in

V 0.00	1226969	1.29×10^{-5}	26378	472.9	1378503	0.969×10^{-5}	22268.6	399.22
H 0.00	20449.				22981.			$\bar{M} = 436.1$
A 0.00								

T/C's Room = 73 #2 = 92 #3 = 92

So $\Delta K \sim$ .001227 .001750

∴ Spintegral worth of control element ~ $\frac{.001750}{.0019} = .78\$$

Assembly L-17 : Pu to Pu = 3.050 cm

Lateral Spacing: 0.690 fixed + 2.360 = 3.050 cm

Vertical Spacing: 1.066 fixed + 1.984 = 3.050 cm*

Parts : Same as L-10

Base Rate = 55.78 $\times 10^5$ n/s

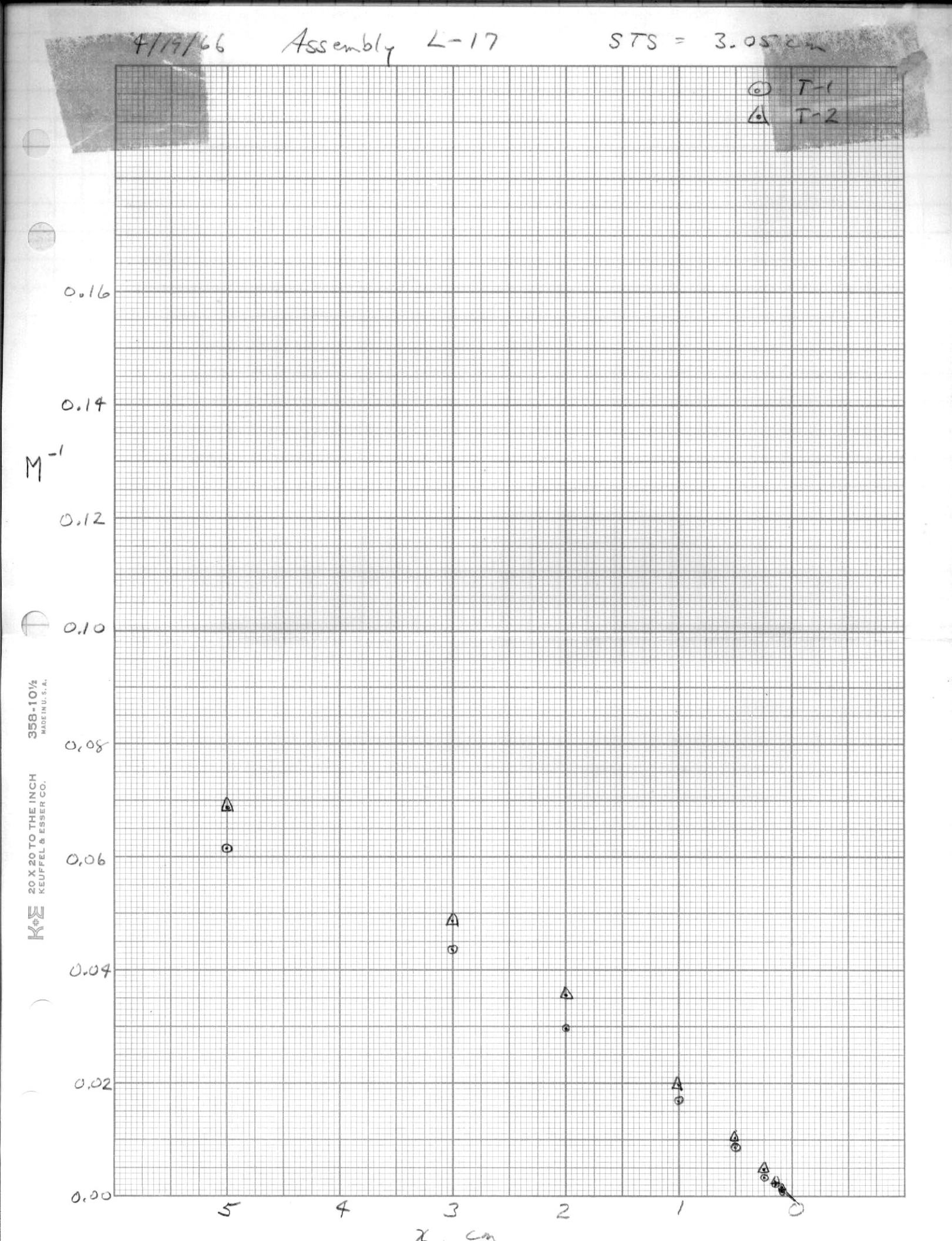
V 0.00	302555	1.29×10^{-5}	650.98	11.66	36026	0.969×10^{-5}	581.82	10.43
H 9.521	504.25				600.43			
A 15.00								

T/C's Room = 72.5 #2 = 101 #3 = 100

V 0.00	42195	1.29×10^{-5}	907.12	16.26	50107	0.969×10^{-5}	809.22	14.51
H 5.00	703.25				835.11			
A 15.00								

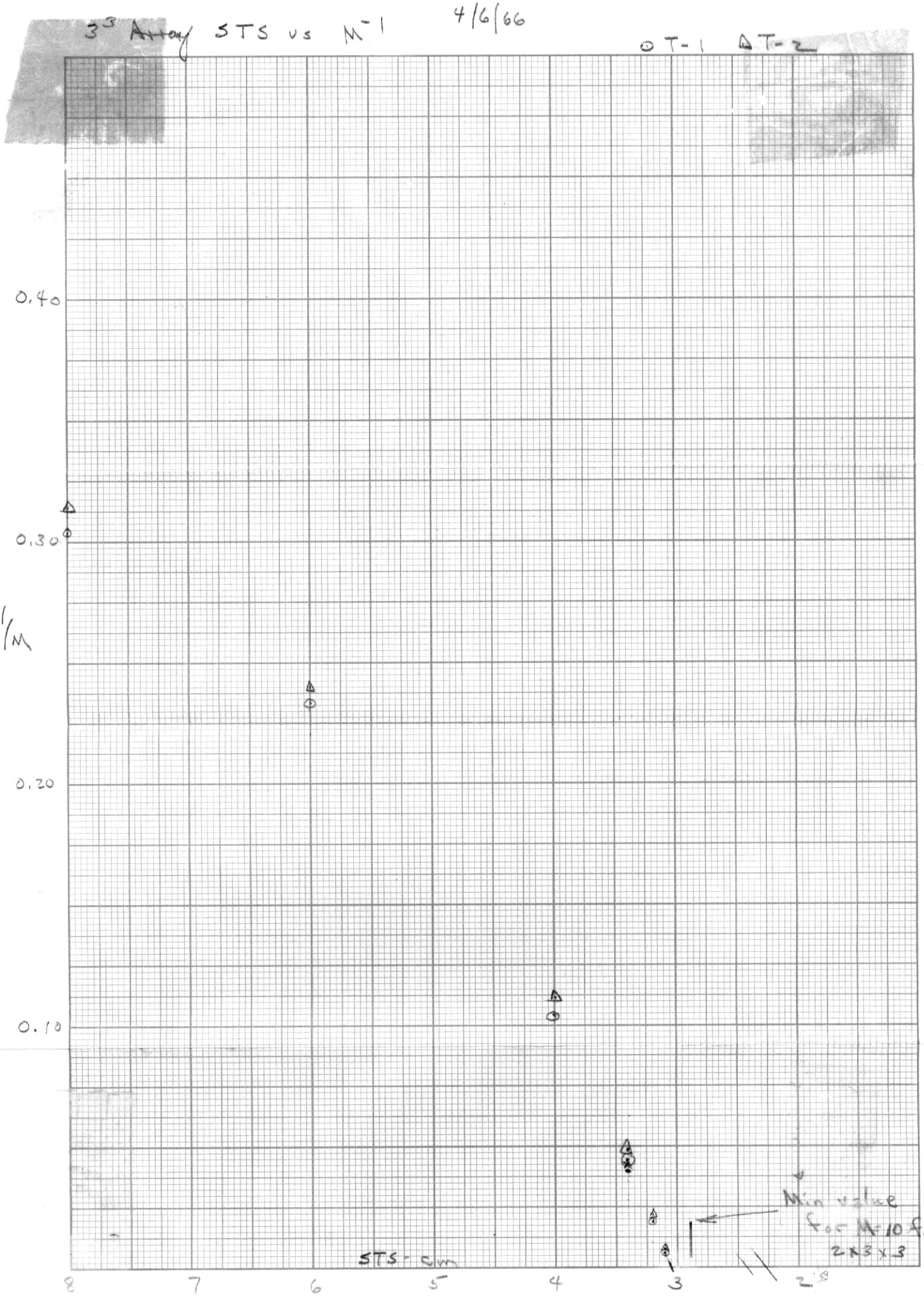
T/C's Room = 73 #2 = 99 #3 = 97

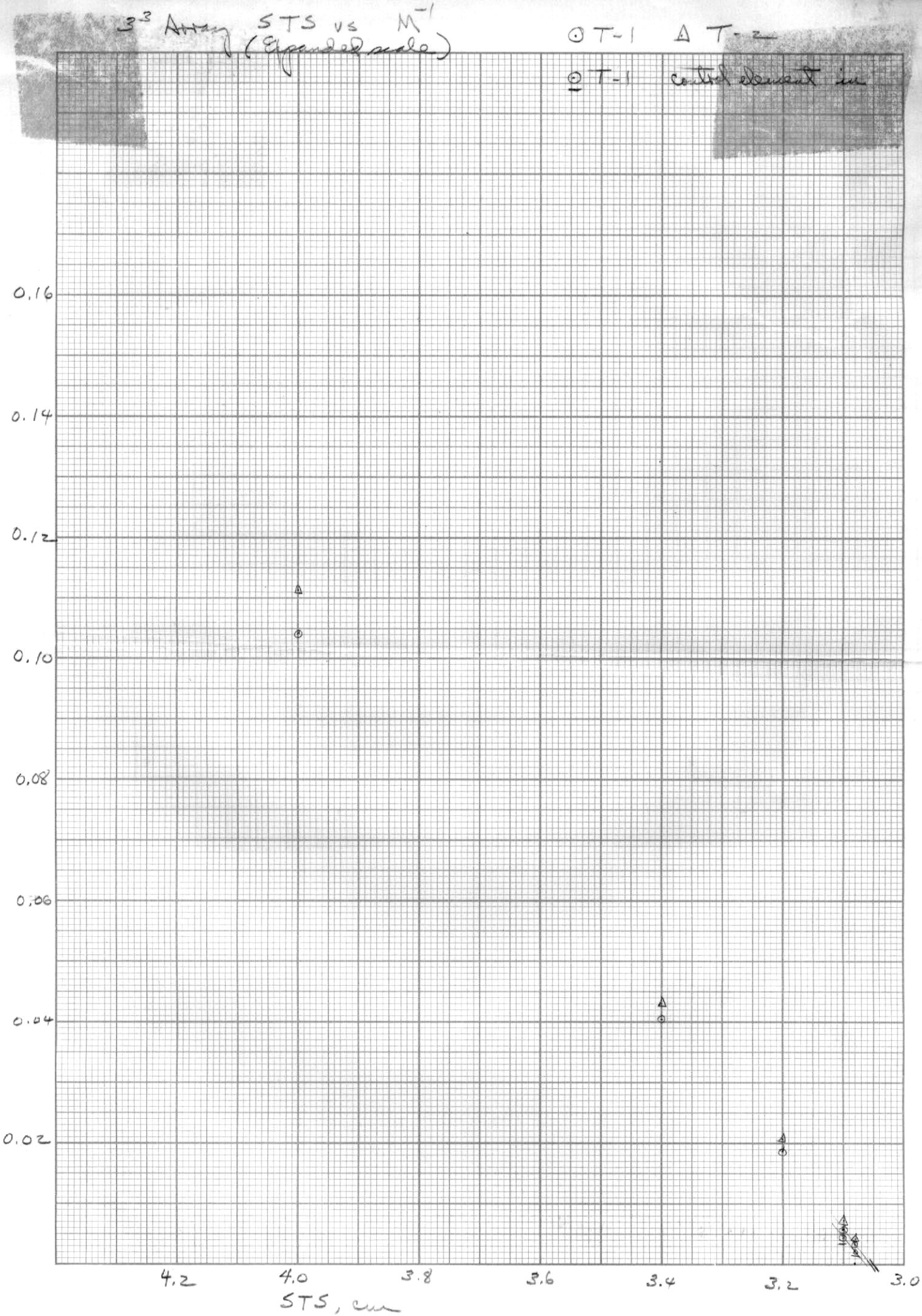
4/19/66 Assembly L-17 STS = 3.05 cm



358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH KEUFFEL & ESSER CO.

Position	Ch T-1	Eff. Factor	10^5 m/s	M	Ch T-2	Eff. Factor	10^5 m/s	M
V 0.00	59541	1.29×10^5	1280.13	22.95	71118	$.968 \times 10^5$	1148.56	20.59
H 3.001	992.35				1185.30			
A 15.00								
	T/C's	Room = 73			# 2 = 99		# 3 = 96.5	
V 0.00	86632	1.29×10^5	1862.58	33.34	97281	$.969 \times 10^5$	1571.09	28.16
H 2.00	1443.86				1621.35			
A 15.00								
	T/C's	Room = 73			#2 = 98		#3 = 95	
V 0.00	153952	1.29×10^5	330988	59.34	175471	$.968 \times 10^5$	2833.84	50.80
H 1.00	2565.8				2924.5			
A 15.00								
	T/C's	Room = 73			#2 = 98		#3 = 94	
V 0.00	302911	1.29×10^5	651257	116.76	341109	$.969 \times 10^5$	5508.62	98.76
H 0.50	5048.5				5685.1			
A 15.00								
	T/C's	Room = 73			#2 = 96		#3 = 92	
V 0.00	772510	1.29×10^5	16608.9	297.8	709576	$.969 \times 10^5$	11459.1	205.4
H 0.25	12875.1				11825.7			
A 15.00								
	T/C's	Room = 73			#2 = 96		#3 = 92	
V 0.00	1191522	1.29×10^5	256168	459.2	1296829	$.969 \times 10^5$	20943.0	375.5
H 0.150	19858.				21613.			
A 15.00								
	T/C's	Room = 73			#2 = 95		#3 = 90	
V 0.00	2029680	1.29×10^5	43638.1	782.3	2307205	$.969 \times 10^5$	37261.0	668.0
H 0.100	33828.				38453			
A 15.00								
	T/C's	Room = 73.5			#2 = 95		#3 = 91	


3³ Array STS vs M⁻¹
4/6/66
○ T-1 △ T-2
0.40
0.30
0.20
0.10
1/M
8
7
6
5
4
3
2
STS - cm
Min value for M=10 for 2×3×3
358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH KEUFFEL & ESSER CO.


3-3 Array STS vs M^{-1} (Expanded scale)
⊙ T-1 △ T-2
⊙ T-1 contact descent in
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
4.2
4.0
3.8
3.6
3.4
3.2
3.0
STS, cm
20 X 20 TO THE INCH
KEUFFEL & ESSER CO.
358-10½
MADE IN U.S.A.

4-20-66

Assembly L-17 will be taken Crit. and bump worths for the control rod and the Horizontal table.

Position	Ch 1 T-1	Eff. Factor	10^5 n/s	M	Ch 2 T-2	Eff. Factor	10^5 n/s	M
V 0.00	29888	1.29×10^{-5}	642.59	11.52	36296	0.969×10^{-5}	586.18	10.51
H 9.52	498.13				604.93			
A 15.00								

T/C's Room = 72.5 #2 = 102 #3 = 105

Crit @ H = 0.095
A = 4.883

T/C's Room = 74 #2 = 94.5 #3 = 97.5

Re-set A = 2.839 to get on positive period.

Doubling Time = 2 min. 33 sec.

Period = 1.443 X 153 sec. = 220.78 sec.

$\Delta A = 2.044$ cm

$\Delta \rho = .056\ \$$

$\frac{\Delta \rho}{\Delta A} = \frac{.056\ \$}{2.044\ cm} = .027\ \$/cm$ (Actuator worth at 2-3 cm)

We will bump the table to determine its worth.

Crit @ H = .150
A = .396

T/C's Room = 73.5 #2 = 93.5 #3 = 97

Bumped table to H = .128 cm

Doubling Time = 1 min. 31 sec

Period = 1.493 × 91 sec = 131.3 sec

ΔH = .022 cm

$\Delta \rho$ = .088 ¢

$\frac{\Delta \rho}{\Delta H} = \frac{.088\text{¢}}{.022\text{ cm}} = 4.\text{¢/cm}$ (Worth of table)

We will bump the actuator again at a position closer to full in.

Crit. @ H = .128
A = 0.975

Beckman #1 = 2.0×10^{-8}
Power ~ 20%

T/C's Room = 73 #2 = 93.5 #3 = 97

Bump actuator to A = 0.150 cm

Doubling Time = 1 min 6 sec

Period = 1.493 × 66 sec = 95.2 sec

ΔA = 0.825 cm

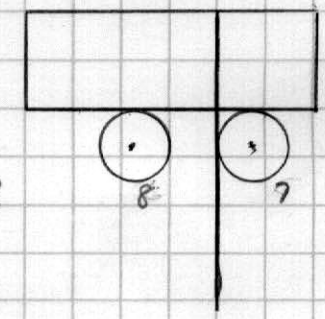
$\Delta \rho$ = .12 ¢

$\frac{\Delta \rho}{\Delta A} = \frac{.12\text{¢}}{.825\text{cm}} = .14\text{¢/cm}$ (Actuator worth at 1 cm - 0. cm)

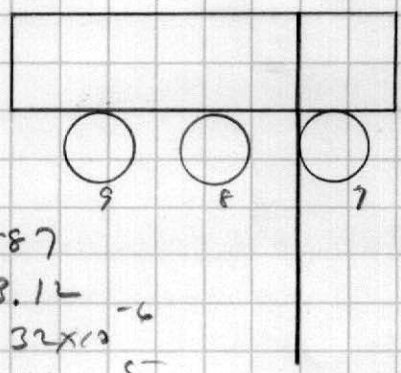
4-21-66 Reflected 3^3 Array Series

The safety experiments will be done for the reflected 3^3 array as described in Assembly Procedure No. 7.

Eff. Factor calculations for the safety experiments



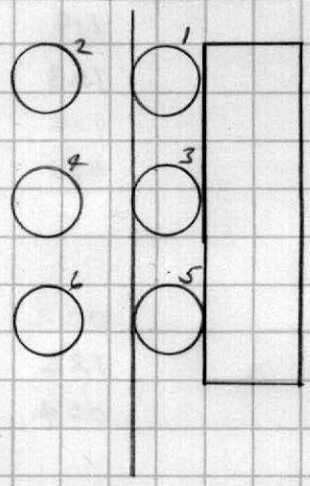
		T-1	T-2
Count Rates: Col. 7	ϕ_m		
	ϕ_s		
	Eff		
	Eff. Factor		
Count Rates: Col. 8	ϕ_m		
	ϕ_s		
	Eff		
	Eff. Factor		
	Avg.	$.890 \times 10^{-5}$	3.07×10^{-5}



Count Rates: Col. 7	ϕ_m	8773	2587
	ϕ_s	146.22	43.12
	Eff	11.25×10^{-6}	3.32×10^{-6}
	Eff. Factor	$.889 \times 10^{-5}$	3.01×10^{-5}
Count Rates: Col. 8	ϕ_m	8764	2540
	ϕ_s	146.07	42.33
	Eff.	11.24×10^{-6}	3.26×10^{-6}
	Eff. Factor	$.890 \times 10^{-5}$	3.07×10^{-5}

Count Rates: Col. 9	c/m	8780	2566
	c/s		
	Eff		
	Eff. Factor		
	Avg.	$.890 \times 10^{5}$	3.07×10^{5}

		T-1	T-2
Count Rates: Col. 1	c/m	4940	9011
	c/s	82.33	150.18
	Eff.	6.33×10^{-6}	11.55×10^{-6}
	Eff. Factor	1.58×10^{5}	$.866 \times 10^{5}$
Count Rates Col. 2	c/m	5256	8878
	c/s	87.60	147.97
	Eff.	6.74×10^{-6}	11.38×10^{-6}
	Eff. Factor	1.48×10^{5}	$.879 \times 10^{5}$
Count Rates Col. 3	c/m	6065	7671
	c/s	101.08	127.85
	Eff.	7.78×10^{-6}	9.83×10^{-6}
	Eff. Factor	1.29×10^{5}	1.02×10^{5}
Count Rates Col. 4	c/m	6281	7880
	c/s	104.68	131.33
	Eff.	8.05×10^{-6}	10.10×10^{-6}
	Eff. Factor	1.24×10^{5}	$.990 \times 10^{5}$
Count Rates Col. 5	c/m	7448	6245
	c/s	124.13	104.08
	Eff.	9.55×10^{-6}	8.01×10^{-6}
	Eff. Factor	1.05×10^{5}	1.25×10^{5}
Count Rates Col. 6	c/m	6977	6692
	c/s	116.28	111.53
	Eff.	8.94×10^{-6}	8.58×10^{-6}
	Eff. Factor	1.12×10^{5}	1.17×10^{5}
	Avg.	1.29×10^{5}	1.03×10^{5}



Part. #	Base Rate		
115	2.07×10^{-5}	Bottom	Col. 1
127	2.06		
119	2.10	Top	
123	2.11	Bottom	Col. 2
114	2.07		
001	2.03	Top	
	12.44×10^{-5}		
002	2.05		Col. 3
126	2.08		
004	1.99		
	16.56×10^{-5}		
005	1.97		Col. 4
112	2.09		
110	2.03		
130	2.14		Col. 5
124	2.15		
128	2.13		
122	2.09		Col. 6
102	2.09		
098	2.02		
	32.27×10^{-5}		

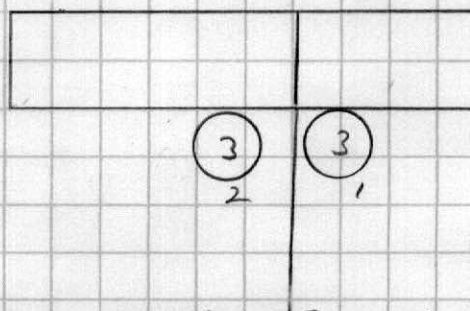
Assembly M-1 : P_M to P_M = 4.250 cm

Lateral Spacing = 0.69 fixed + 3.556 = 4.246 cm

Vertical Spacing = 1.066 fixed + 3.183 = 4.249 cm

Parts : 115, 127, 119, 123, 114, 001

Base Rate : 12.44×10^{-5} m/s

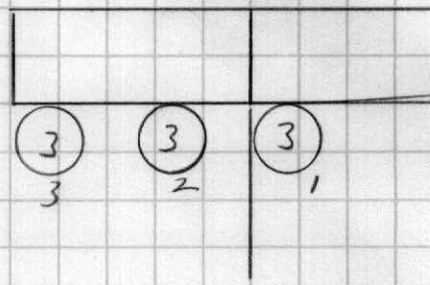


Position	Ckt-1	Eff Factor	10^{-5} m/s	M	Ckt-2	Eff Factor	10^{-5} m/s	M
V 0.00	2582	$.850 \times 10^{-5}$	38.30	3.08	753	3.07×10^{-5}	38.53	3.10
H 9.530	43.03				12.55			
V 0.00	9715/3	$.850 \times 10^{-5}$	48.03	3.86	2210/3	3.07×10^{-5}	37.70	3.03
H 0.00	53.97				12.28			

Assembly M-2 : P_M to P_M = 8.250 cm

Parts : 115, 127, 119, 123, 114, 001, 002, 126, 004

Base Rate : 18.56×10^{-5} m/s

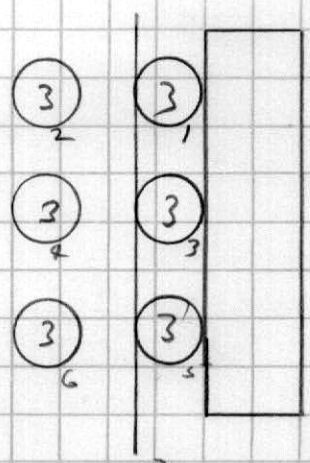


V 0.00	17122/3	$.850 \times 10^{-5}$	84.66	4.56	3839/3	3.07×10^{-5}	65.48	3.53
H 0.00	95.12				21.33		$\bar{M}$ = 4.10	

Assembly M-3: Pu to Pu = 4.250 cm

Parts: 115, 127, 119, 123, 114, 001, 002, 126, 004, 005, 112, 110, 130, 124, 128, 122, 102, 098

Base Rate: 37.27×10^5 n/s



	Position	Ch 5 T-1	Eff. Factor	10^5 n/s	M	Ch 5 T-2	Eff. Factor	10^5 n/s	M
V	0.00	27038/2	1.29×10^{-5}	290.66	7.80	33573/2	1.03×10^{-5}	287.66	7.72
H	0.00	225.32				279.28			$\bar{M} = 7.76$

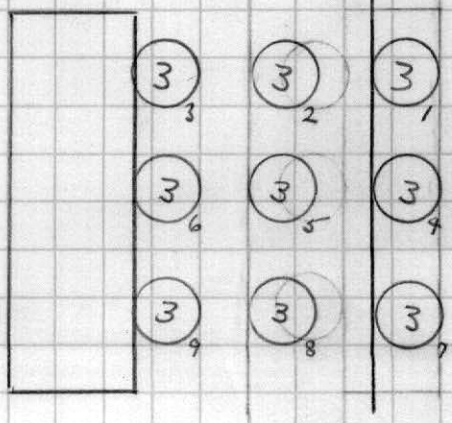
4-22-66

Assembly M-4: Pu to Pu = 8.000 cm

Lateral Spacing: 0.69 fixed + 7.310 = 8.000 cm

Vertical Spacing: 1.066 fixed + 6.934 = 8.000 cm

Parts: Same as L-10



Base Rate = 55.78×10^5 n/s

Eff. Factor Calculation:		T-1	T-2
Count Rates:	c/m	6020	7632
Avg. of 9 cols.	c/s	100.33	127.20
	Eff.	7.72×10^{-1}	9.78×10^{-1}
	Eff. Factor	1.30×10^{-5}	1.02×10^{-5}

V	0.00	9007	1.30×10^{-5}	195.16	3.50	11467	1.02×10^{-5}	198.93	3.50
H	9.524	150.12				191.11			
	T/C's	Room = 73				#2 = 103		#3 = 118	

V	0.00	9815	1.30×10^{-5}	212.65	3.81	12574	1.02×10^{-5}	213.75	3.83
H	0.00	163.58				209.56			
	T/C's	Room = 73				#2 = 96		#3 = 109	

Assembly M-5: Pu to Pu = 6.000 cm

Lateral Spacing: 0.69 fixed + 5.310 cm = 6.000 cm

Vertical Spacing: 1.066 fixed + 4.934 cm = 6.000 cm

Parts: Same as L-10

Base Rate = 55.78 $\times 10^{-5}$ n/s

Position	Ch T-1	Eff Factor	10^{-5} n/s M	Ch T-2	Eff Factor	10^{-5} n/s M
V 0.000	11584	1.30×10^{-5}	250.98 4.50	17813	1.02×10^{-5}	251.82 4.51
H 9.531	193.06			246.88		
T/C's	Room = 73		#2 = 101		#3 = 102	
V 0.00	14059	1.30×10^{-5}	304.60 5.46	17813	1.02×10^{-5}	302.82 5.43
H 0.00	234.31			296.88		
T/C's	Room = 73		#2 = 99		#3 = 96	

4-25-66

Assembly M-6: Pu to Pu = 5.000 cm

Lateral Spacing: 0.69 fixed + 4.310 = 5.000 cm

Vertical Spacing: 1.066 fixed + 3.930 = 4.996 cm

Parts: Same as L-10

Base Rate = 55.78 $\times 10^{-5}$ n/s

V	0.00	14848	1.30×10^{-5}	321.70 5.77	18773	1.02×10^{-5}	319.14 5.72
H	9.531	247.46			312.88		
	T/C's	Room = 74		#2 = 103		#3 = last it	
V	0.00	20461	1.30×10^{-5}	443.31 7.95	25959	1.02×10^{-5}	441.30 7.91
H	0.00	341.01			432.65		
	T/C's	Room = 73		#2 = 99			

4-26-66

Assembly M-7: Pu to Pu = 4.500 cm

Lateral Spacing: 0.69 fixed + 3.810 = 4.500 cm

Vertical Spacing: 1.066 fixed + 3.434 cm = 4.500 cm

Parts: Same as L-10

Base Rate = 55.78×10^5 n/s

Position	Ch T-1	Eff Factor	10^5 n/s	M	Ch T-2	Eff Factor	10^5 n/s	M
V 0.00	18677	1.30×10^5	409.66	7.25	23319	1.02×10^5	396.42	7.11
H 9.530	311.28				388.65			
A 15.00								
T/C's	Room = 73		#2 = 101		#3 = 107			
V 0.00	30644	1.30×10^5	663.95	11.90	37786	1.02×10^5	642.36	11.52
H 0.00	510.73				629.76			
A 15.00								
T/C's	Room = 73		#2 = 96		#3 = 102			

4-27-66

Assembly M-8: Pu to Pu = 4.250 cm

Lateral Spacing: 0.69 fixed + 3.557 cm = 4.247 cm

Vertical Spacing: 1.066 fixed + 3.184 cm = 4.250 cm

Parts: Same as L-10

Base Rate = 55.78×10^5 n/s

V	0.00	20980	1.30×10^5	454.56	8.15	25360	1.02×10^5	431.11	7.73
H	9.530	349.66				422.66			$\bar{M} = 7.94$
T/C's		Room = 72			#2 = 104		#3 = 100		
V	0.00	38542	1.30×10^5	835.07	14.97	47224	1.02×10^5	802.80	14.39
H	0.00	642.36				787.06			
T/C's		Room = 72			#2 = 99		#3 = 95		

4-28-66

Assembly M-9: Pu to Pu = 3.800 cm

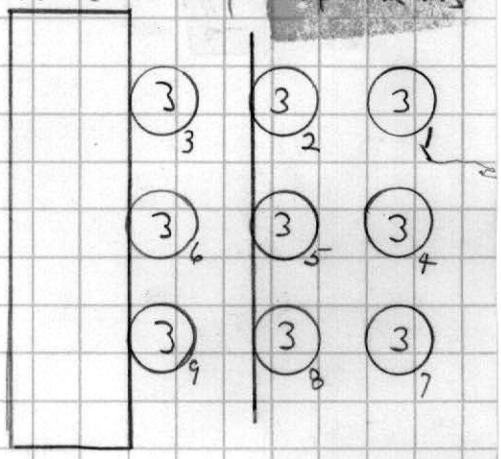
Lateral Spacing: 0.69 fixed + 3.112 = 3.802 cm

Vertical Spacing: 1.066 fixed + 2.734 = 3.800 cm

Parts: Same as 2-10

Base Rate = 55.78 $\times 10^{-5}$ n/s

Assembly changed to one below in order to avoid more safely experiments

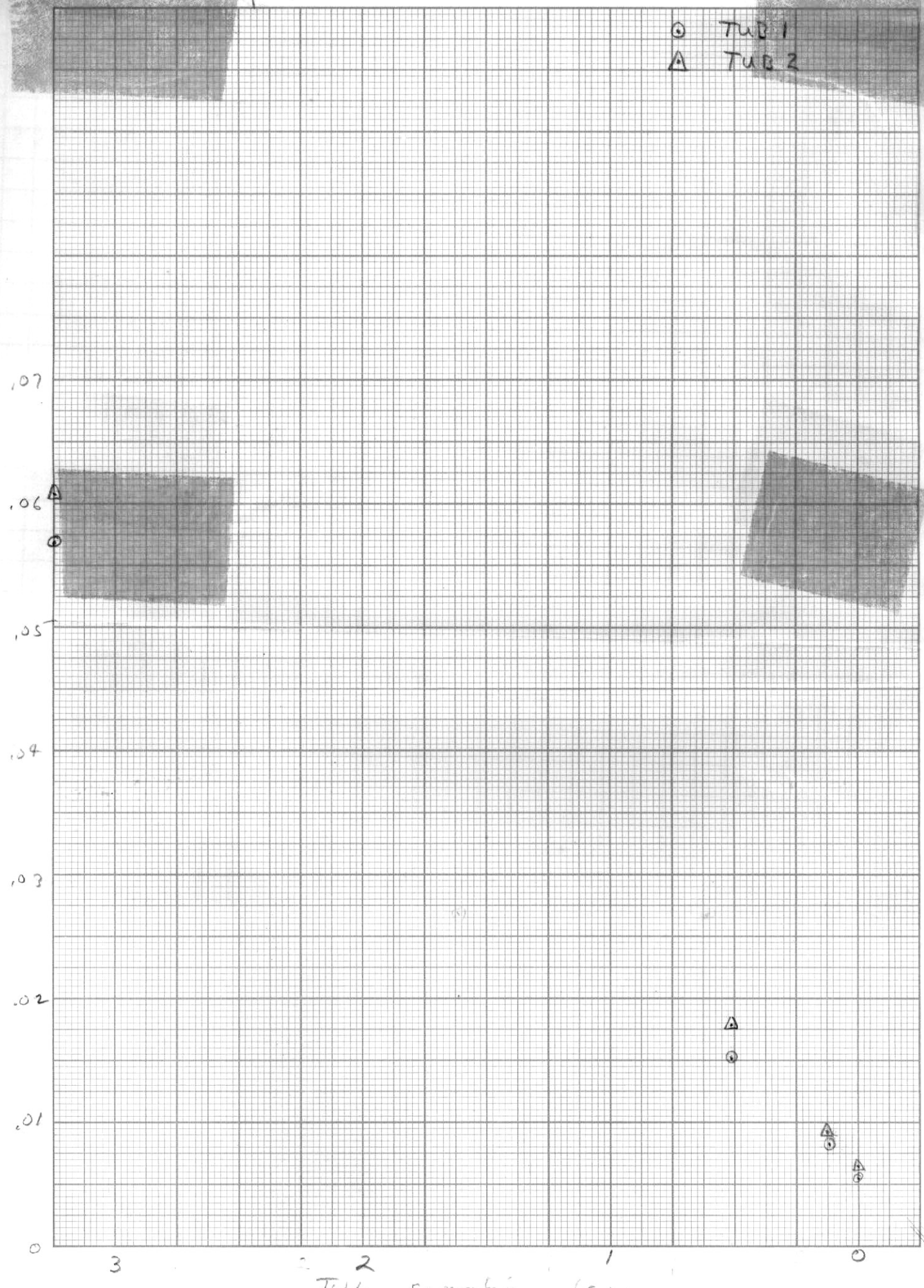


Eff. Factor was checked for this assembly by checking Col. 6 with the source which before has been the same as the avg. It was within 2-3% of the previous assembly. Therefore we will use same Eff. Factors.

	T-1	T-2
Count Rate	6228	7841
Col. 6	1.25 $\times 10^{-5}$	.995 $\times 10^{-5}$

Position	Ch T-1	Eff. Factor	10^{-5} n/s	M	Ch T-2	Eff. Factor	10^{-5} n/s	M
V 0.00	21987	1.30 $\times 10^{-5}$	476.39	8.54	26553	1.02 $\times 10^{-5}$	451.40	8.09
H 9.579	366.85				442.55			$\bar{M}$ = 8.32
A 15.00								
T/C's	Room = 72				#2 = 100		#3 = 100	
V 0.00	41918	1.30 $\times 10^{-5}$	908.22	16.28	50993	1.02 $\times 10^{-5}$	866.88	15.54
H 2.570	698.63				849.88			$\bar{M}$ = 15.91
A 15.00								
T/C's	Room = 73				#2 = 98		#3 = 98	
V 0.00	96312	1.30 $\times 10^{-5}$	2086.26	37.41	115391	1.02 $\times 10^{-5}$	1970.74	35.33
H 0.370	1605.20				1923.1			$\bar{M}$ =
A 15.00								
T/C's	Room = 73				#2 = 98		#3 = 98	
V 0.00	133138	1.30 $\times 10^{-5}$	2884.6	51.71	156808	1.02 $\times 10^{-5}$	2665.67	47.79
H 0.00	2218.9				2613.4			$\bar{M}$ =
A 15.00								
T/C's	Room = 73				#2 = 98		#3 98	

4-28-66 3^3 Array Reflected STS = 3.650 cm



358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH KEUFFEL & ESSER CO.

Assembly M-10 : Pu to Pu = 3.650 cm

Lateral Spacing: 0.69 fixed + 2.960 = 3.650 cm

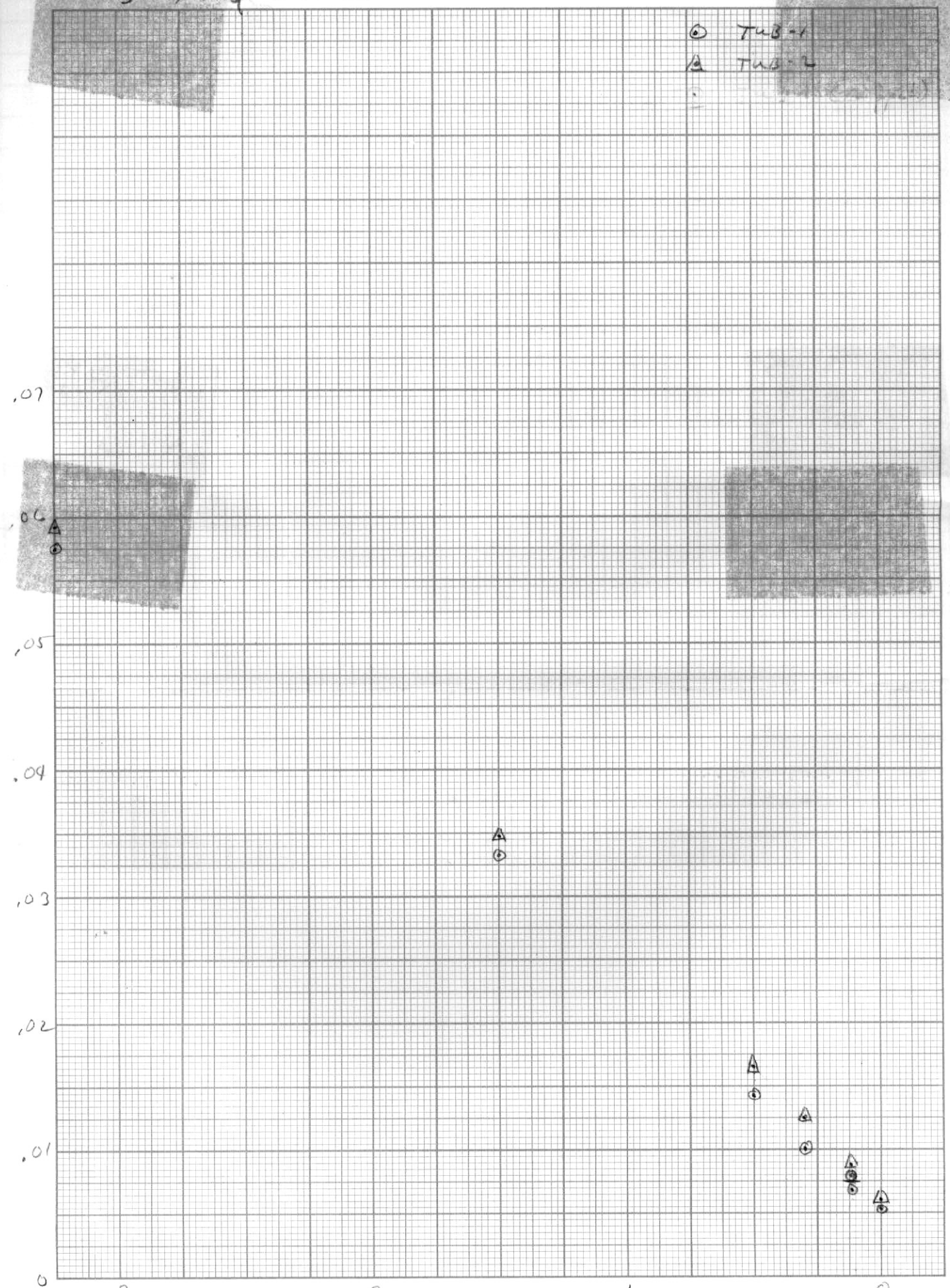
Vertical Spacing: 1.066 fixed + 2.584 = 3.650 cm

Parts: Same as L-10

Base Rate = 55.78 $\times 10^{-5}$ g/s

Position	Cs T-1	Eff. Factor	10^{-5} g/s	M	Cs T-2	Eff. Factor	10^{-5} g/s	M
V 0.00	23887	1.30×10^{-5}	517.54	9.28	29158	1.02×10^{-5}	495.68	8.89
H 9.530	398.11				485.96			$\bar{M}$ = 9.09
A 15.00								
	T/C's	Room = 73.5			#2 = 95		#3 = 106	
V 0.00	44459	1.30×10^{-5}	963.27	17.27	53959	1.02×10^{-5}	917.30	16.45
H 3.250	740.98				899.31			$\bar{M}$
A 15.000								
	T/C's	Room = 73.5			#2 = 94		#3 = 104	
V 0.00	157877	1.30×10^{-5}	3420.56	61.32	184205	1.02×10^{-5}	3131.4	56.14
H 0.529	2631.2				3070.0			
A 15.00								
	T/C's	Room = 73			#2 = 93		#3 = 100	
V 0.00	318495	1.30×10^{-5}	6900.7	123.7	353933	1.02×10^{-5}	6016.8	107.9
H 0.120	5308.2				5898.8			
A 15.00								
	T/C's	Room = 73			#2 = 92		#3 = 100	
V 0.00	472382	1.30×10^{-5}	10234.9	183.5	508263	1.02×10^{-5}	8640.4	154.9
H 0.00	7873.0				8471.0			
A 15.00								
	T/C's	Room = 73			#2 = 92		#3 = 100	

4-29-66 3⁷ Array Reflected Re-Run STS = 3.650 cm



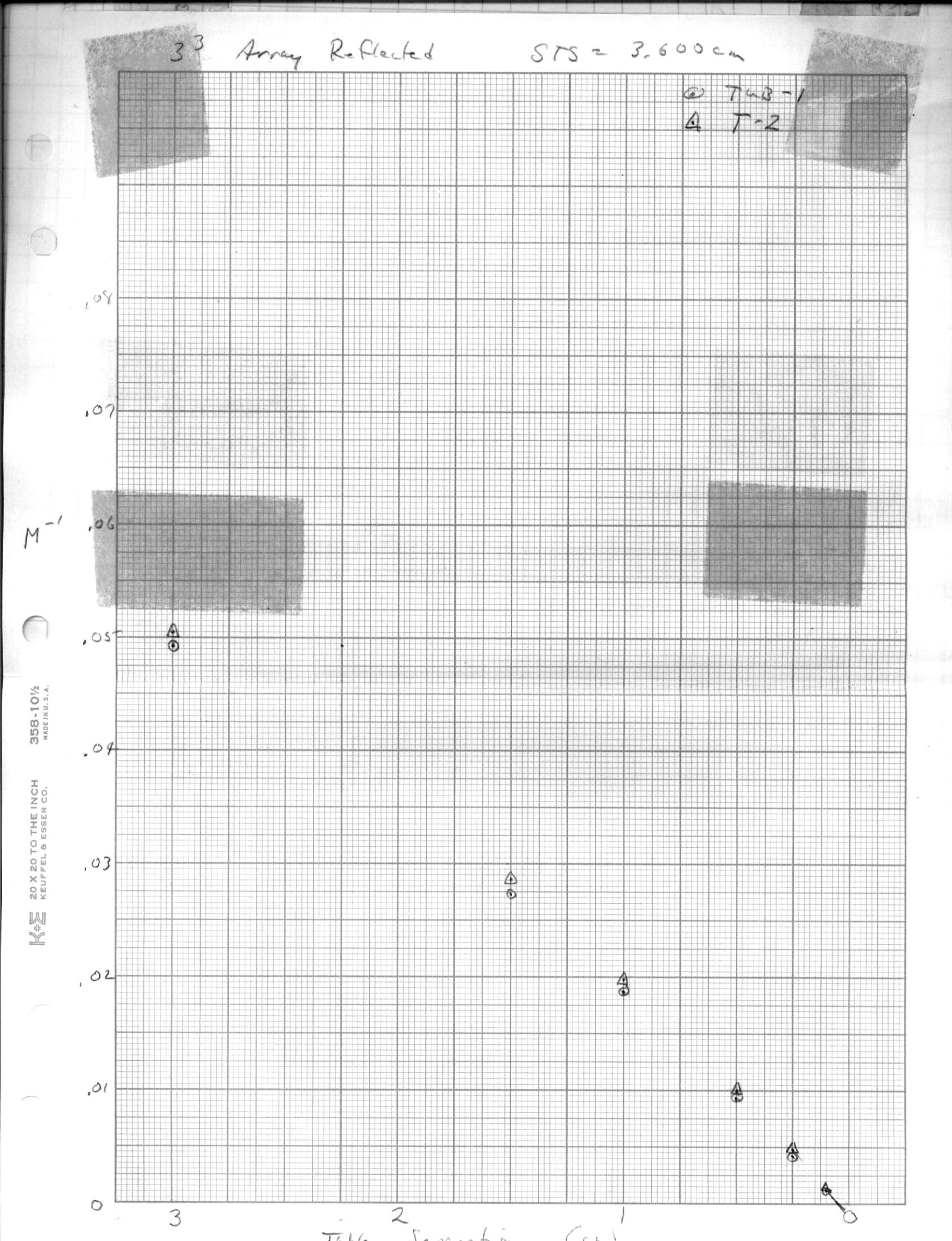
358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH
KEUFFEL & ESSER CO.

4-29-66

Looking at the pulses of TuB-1 and TuB-2, it was found that the pulse width of TuB-2 was greater by ~30%. ∴ this may have given us the difference seen 4-28-66 in the multiplication as given by TuB-1 and TuB-2. We have therefore clipped the pulses of TuB-2 so that the pulse width is smaller than TuB-1. We will now re-run Assembly M-10 to check this effect and see if it was truely dead time.

Re-Run of Assembly M-10: Pu to Pu = 3.650 cm

Position	Cts T-1	Eff Factor	10^5 n/s	M	Cts T-2	Eff Factor	10^5 n/s	M
V 0.00	24042	1.30×10^{-5}	520.91	9.03	29780	1.02×10^{-5}	506.26	9.08
H 9.530	400.70				496.33			
T/C's	Room = 73				#2 = 94		#3 = 100	
V 0.00	33368	1.30×10^{-5}	722.97	12.96	41577	1.02×10^{-5}	706.81	12.67
H 5.000	556.13				692.95			
T/C's	Room = 73				#2 = 93		#3 = 99	
V 0.00	44815	1.30×10^{-5}	970.58	17.41	55465	1.02×10^{-5}	942.90	16.90
H 3.250	746.91				924.41			
T/C's	Room = 73				#2 = 92		#3 = 99	
V 0.00	77010	1.30×10^{-5}	1668.53	29.91	98139	1.02×10^{-5}	1600.36	28.69
H 1.498	1283.5				1628.98			
T/C's	Room = 73				#2 = 92.		#3 = 98	
V 0.00	178394	1.30×10^{-5}	3865.16	69.3	197885	1.02×10^{-5}	3364.0	60.31
H 0.500	2973.2				3298.0			
T/C's	Room = 73				#2 = 92		#3 = 98	
V 0.00	251908	1.30×10^{-5}	5457.9	97.85	263063	1.02×10^{-5}	4472.0	80.17
H 0.300	4198.4				4384.3			
T/C's	Room = 73				#2 = 92		#3 = 98	
V 0.00	374456	1.30×10^{-5}	8113.17	145.44	379794	1.02×10^{-5}	6456.5	115.75
H 0.12	6240.9				6329.9			
T/C's	Room = 73				#2 = 92		#3 = 98	


3³ Array Reflected
STS = 3.600 cm
T-3-1
T-2
.08
.07
M⁻¹
.06
.05
.04
.03
.02
.01
0
3
2
1
0
20 X 20 TO THE INCH
KEUFFEL & ESSER CO.
358-10½
MADE IN U.S.A.

We will check last point

Position	Cts T-1	Eff Factor	10^5 n/s	M	Cts T-2	Eff Factor	10^5 n/s	M
V 0.00	322180	1.30×10^{-5}	6980.5	125.14	384645	1.02×10^{-5}	6538.9	117.22
H 0.12	5369.6				6410.7			
	T/C's	Room = 73			#2 = 92		#3 = 97	
V 0.00	406403	1.30×10^{-5}	8805.3	157.9	472383	1.02×10^{-5}	8030.5	144.0
H 0.05	6773.3				7873.0			
	T/C's	Room = 73			#2 = 92		#3 = 97	
V 0.00	470581	1.30×10^{-5}	10195.9	182.8	544648	1.02×10^{-5}	9258.9	166.0
H 0.00	7843.0				9077.4			
	T/C's	Room = 73			#2 = 92 (Middle)		#3 = 97 (Top)	

From this run it's shows that clipping the pulse helped stabilize the count rates and also increased the count rate of T-2. Clipping T-1 didn't increase the count rate but it did make the count rate more stable.

Assembly M-11: Pu to Pu = 3.600 cm

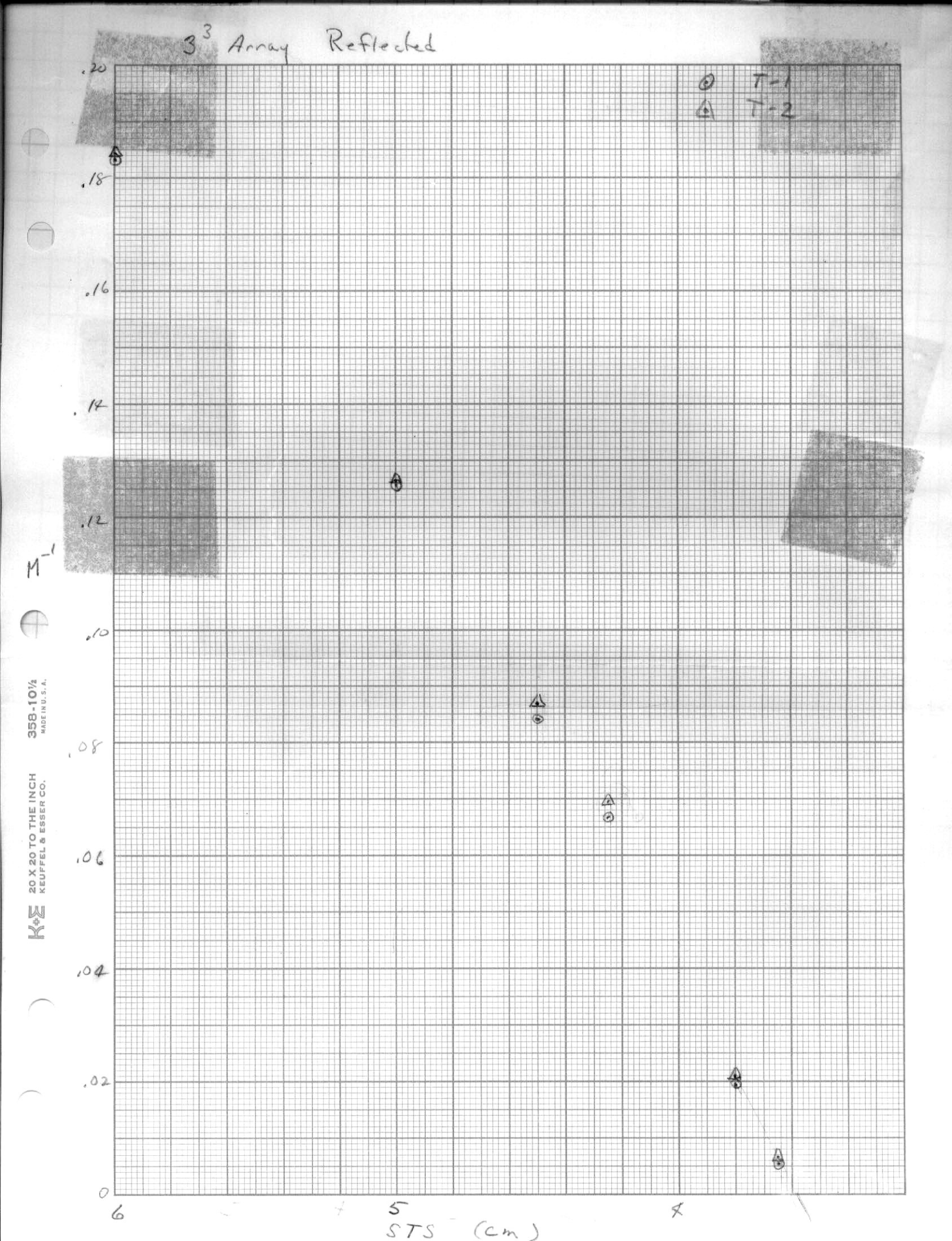
Lateral Spacing: 0.69 fixed + 2.910 cm = 3.600 cm

Vertical Spacing: 1.066 fixed + 2.534 = 3.600 cm

Parts: Same as L-10

Base Rate = 55.078 $\times10^5$ n/s

Position	Cts T-1	Eff Factor	10^5 n/s M		Cts T-2	Eff Factor	10^5 n/s	M
V 0.00	25387	1.30×10^{-5}	5500.4	9.86	30728	1.02×10^{-5}	5223.7	
H 9.533	4231.1				5121.3			
	T/C's	Room = 73			#2 = 103		#3 = 105	
V 0.00	36164	1.30×10^{-5}	7835.9	14.05	44384	1.02×10^{-5}	7545.2	13.53
H 2.995	6027.6				7397.3			
	T/C's	Room = 73			#2 = 102		#3 = 105	
V 0.00	52123	1.30×10^{-5}	11293.2	20.25	69851	1.02×10^{-5}	11028.7	19.8
H 3.000	8687.1				10808.5			
	T/C's	Room = 73			#2 = 102		#3 = 104	


3^3 Array Reflected
T-1
T-2
.20
.18
.16
.14
.12
.10
.08
.06
.04
.02
0
M^{-1}
6
5
4
STS (cm)
358-10½
MADE IN U.S.A.
20 X 20 TO THE INCH
KEUFFEL & ESSER CO.

@ Fast Shp T-1 = 25-309 T-2 = 31141

T/c's Room = 72 #2 = 112 #3 = 100 (Looks like we lost #3)

Crit @ H = 0.093
A = 1.194

T/c's Room = 72.5 #2 = 103

We will now bump the table

Re-set H = 0.078 Beckman #1 = 1.5×10^{-8}

Doubling Time = 1 min. 25 sec = 85 sec

Period = 1.443 x 85 sec = 122.7 sec

ΔH = 0.019 cm

$\Delta \rho$ = .094$

$\frac{\Delta \rho}{\Delta H} = \frac{.094\$}{.019\ cm} = 4.95\$/cm$ (Worth of Table)

Re-determine Crit @ H = .093
A = .959

T/C's Room = 73 #2 = 102

We will bump the actuator.

Re-set A = .040 Beckman #1 = $.6 \times 10^{-8}$

Doubling Time = 2 min. 18 sec. = 138 sec.

Period = 1.443 x 138 sec = 199.1 sec

ΔA = .919 cm

$\Delta \rho$ = .062$

$\frac{\Delta \rho}{\Delta A} = \frac{.062\$}{.919\ cm} = .067\$/cm$ (Worth of actuator)

We will re-check these worths.

Fast Stop T-1 = 25785 T-2 = 31386
T/C's Room = 72 #2 = 112

Crit @ H = .093 Back #1 = $.25 \times 10^{-8}$
A = .736
T/C's Room = 73 #2 = 103

Re-set H = .074 cm

Doubling Time = 1 min. 4 sec. = 64 sec

Period = 1.443 x 64 = 92.4 sec

ΔH = .019 cm

$\Delta \rho$ = .118 $

$\frac{\Delta \rho}{\Delta H} = \frac{.118\ \$}{.019\ cm} = 6.21\ \$/cm$ (Table Worth)

Scrammed (again) We will try again and again.

Fast Stop T-1 = 25625 T-2 = 31606
T/C's Room = 73 #2 = 104

Crit @ H = .084 Back #1 = 3.2×10^{-9}
A = 1.333
T/C's Room = 72 #2 = 101

Re-set A = -0.010 cm

Doubling Time = 2 min 31 sec = 151 sec

Period = 1.443 x 151 sec = 217.9 sec

ΔA = 1.343 cm

$\Delta \rho$ = .057 $

$\frac{\Delta \rho}{\Delta A} = \frac{.057\ \$}{1.343\ cm} = .042\ \$/cm$ (actuator worth)

Re-determine Crit @ A = .447 Peak #1 = 1.35 x 10^8
H = .086

T/C's Room = 72 #2 = 101

Re-set H = .064

Doubling Time = 1 min 1 sec = 61 sec

Period = 1.443 x 61 sec = 88.0 sec

ΔH = .022 cm

$\Delta \rho$ = .122 $

$\frac{\Delta \rho}{\Delta H} = \frac{.122\ \$}{.022\ cm} = 5.55\ \$/cm$ (Table worth)

Re-determine Crit @ A = 1.143 Back. #1 = .9 x 10^7
H = 0.074

Re-set A = -.006 cm

Doubling Time = 1 min 13 sec = 73 sec.

Period = 1.443 x 73 sec = 105.3 sec

ΔA = 1.149 cm

$\Delta \rho$ = .105 $

$\frac{\Delta \rho}{\Delta A} = \frac{.105\ \$}{1.149\ cm} = .091\ \$/cm$ (Actuator worth)

Position	Chs T-1	Eff. Factor	10^5 n/s	M	Chs T-2	Eff. Factor	10^5 n/s	M
V 0.00	94210	1.30×10^{-5}	2041.3	36.6	114488	1.02×10^{-5}	1945.5	34.9
H 1.580	1570.2				1907.4			
A 15.00								

T/C's Room = 73 #2 = 101 #3 = 103

V	0.00	137920	1.30×10^{-5}	2977.4	53.4	166526	1.02×10^{-5}	2830.9	50.75
H	1.000	2290.3				2775.4			
A	15.00								

T/C's Room = 72.5 #2 = 100 #3 = 102

V	0.000	275586	1.30×10^{-5}	5971.0	107.0	330438	1.02×10^{-5}	5617.3	100.7
H	0.500	4593.1				5507.2			
A	15.000								

T/C's Room = 72 #2 = 99 #3 = 101

V	0.000	611464	1.30×10^{-5}	13248.	237.5	717197	1.02×10^{-5}	12192.3	218.6
H	0.250	10191.0				11953.2			
A	15.000								

T/C's Room = 72 #2 = 99 #3 = 101

V	0.000	2218190	1.30×10^{-5}	48060.	861.6	2815511	1.02×10^{-5}	47930.8	859.3
H	0.101	36969.				46991.			
A	15.000								

T/C's Room = 72.5 #2 = 97 #3 = 100

5-2-66

We will attempt reactivity worth bumps with the table and the control actuator using Assembly M-11 (3^3 array reflected STS = 3.600 cm)

V	0.00	24989	1.30×10^{-5}	30889	1.02×10^{-5}
H	9.530				
A	15.00				

T/C's Room = 73 #2 = 107 #3 = 107

Scrammed!! Bad Relay.

We will try again.

5-3-66

We will bump the table again.

Fast Stop T-1 = 25401 T-2 = 31093
T/C's Room = 73 #2 = 120 #3 = 120

We modified the way the thermocouples were attached to the assembly and as can be seen it made about 20°F difference. We now have better contact with the thermocouples.

Cnit @ H = .095 Beck #1 = 4.3×10^{-9}
A = .300
T/C's Room = 72.5 #2 = 107 #3 = 109

Re-set H = .075

Doubling Time = 1 min 9 sec. = 69 sec

Period = 1.443 x 69 sec = 99.6 sec

ΔH = .020 cm

$\Delta \rho$ = .11 #

$\frac{\Delta \rho}{\Delta H} = \frac{.11\ \#}{.02\ cm} = 5.50\ \#/cm$ (Table Worth)

Re-determine Cnit @ H = .075 Beck #1 = 1.7×10^{-8}
A = 1.743
T/C's Room = 72 #2 = 106.5 #3 = 108

Re-set A = .303 cm

Doubling Time = 1 min 22 sec = 82 sec

Period = 1.443 x 82 sec = 118.3 sec

ΔA = 1.440 cm
$\Delta \rho$ = .095 #
$\frac{\Delta \rho}{\Delta A} = \frac{.095\ \#}{1.440\ cm} = .066\ \#/cm$

Part #	Base Rate
115	2.07×10^{-5}
127	2.06
119	2.10
123	2.11
114	2.07
001	2.03
002	2.05
126	2.08
Total	16.57×10^{-5} n/s

We will now determine STS$_c$ for the 2x2x1 Array (6 Kg)

Assembly N-1: Pu to Pu = 5.000 cm (6 Kg)

Lateral Spacing: 0.68 fixed + 4.308 = 4.988 cm

Vertical Spacing: .442 fixed (Min.) = .442 cm

Parts: 115, 127, 119, 123, 118, 001, 002, 126

Base Rate: 16.57×10^5 n/s

Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.00	3478	1.29×10^5	74.78	4.54	4507	$.969 \times 10^5$	72.79	4.39
H 9.530	57.97				75.12			
T/C's	Room = 73				#2 = 100 (115)	#3 = 105 (127)		
V 0.00	13246/3	1.29×10^5	94.93	5.72	16731/3	$.969 \times 10^5$	90.07	5.44
H 0.00	73.59				92.95			
T/C's	Room = 72				#2 = 97	#3 = 102		

Assembly N-2: Pu to Pu = 4.000 cm

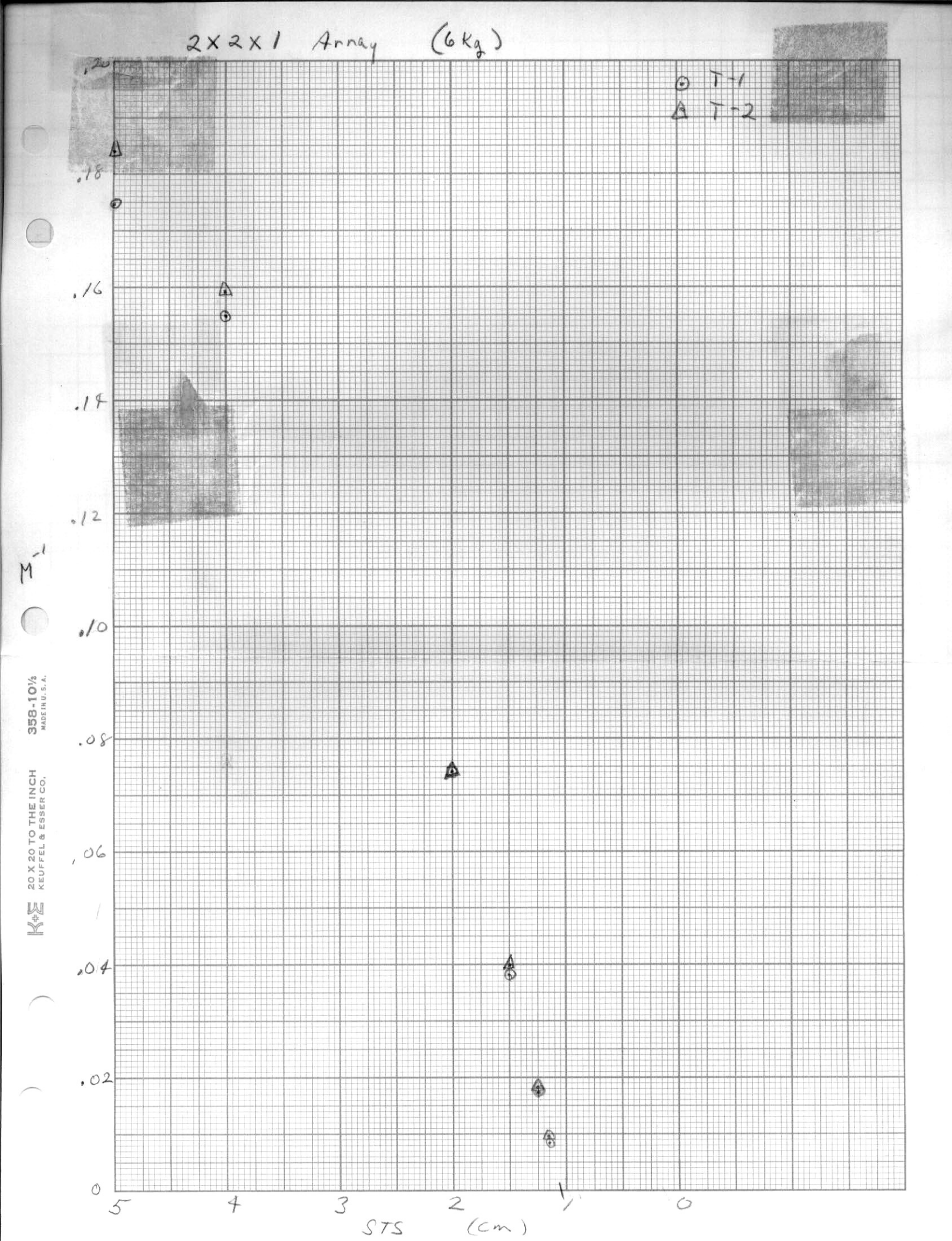
Lateral Spacing: 0.68 fixed + 3.310 = 4.000 cm

Vertical Spacing: .442 fixed = .442 cm

Parts: Same as N-1

Base Rate: 16.57×10^5 n/s

V	0.00	3611	1.29×10^5	77.63	4.68	4546	$.969 \times 10^5$	73.42	4.43
H	9.522	60.18				75.77			
	T/C's	Room = 74				#2 = 100	#3 = 100		
V	0.00	14929/3	1.29×10^5	107.0	6.46	19316/3	$.969 \times 10^5$	104.0	6.28
H	0.00	82.94				107.3			
	T/C's	Room = 78				#2 = 97	#3 = 97		


2X2X1 Array (6Kg)
T-1
T-2
.20
.18
.16
.14
.12
.10
.08
.06
.04
.02
0
M⁻¹
5
4
3
2
1
0
STS (cm)
358-10½
MADE IN U.S.A.
20 X 20 TO THE INCH
KEUFFEL & ESSER CO.

5-4-66

Assembly N-3: Pu to Pu = 2.000 cm

Lateral Spacing: 0.69 fixed + 1.313 = 2.003 cm

Vertical Spacing: 0.442 fixed = .442 cm

Parts: Same as N-1

Base Rate: 16.57×10^5 n/s

Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff. Factor	10^5 n/s	M
V 0.00	12451/3	1.29×10^{-5}	89.23	5.39	16645/3	$.969 \times 10^{-5}$	89.60	5.41
H 9.530	69.17				92.47			
T/C's		Room = 73			#2 = 102		#3 = 107	
V 0.00	15984/2	1.29×10^{-5}	171.83	10.37	20793/2	$.969 \times 10^{-5}$	167.91	10.13
H 0.850	133.20				173.28			
T/C's		Room = 73			#2 = 100		#3 = 105	
V 0.00	20773/2	1.29×10^{-5}	223.31	13.48	27750/2	$.969 \times 10^{-5}$	224.08	13.52
H 0.00	173.11				231.25			
T/C's		Room = 73			#2 = 100		#3 = 105	

Assembly N-4: Pu to Pu = 1.500 cm

Lateral Spacing: 0.69 fixed + .810 = 1.500 cm

Vertical Spacing: 0.442 fixed = .442 cm

Parts: Same as N-1

Base Rate = 16.57×10^5 n/s

V 0.000	9184/2	1.29×10^{-5}	98.72	5.96	11768/2	$.969 \times 10^{-5}$	95.03	5.74
H 9.530	76.53				98.07			
T/C's		Room = 72			#2 = 102		#3 = 106	
V 0.000	15315/2	1.29×10^{-5}	164.6	9.94	19643/2	$.969 \times 10^{-5}$	158.62	9.57
H 2.303	127.63				163.69			
T/C's		Room = 73			#2 = 101		#3 = 105	

Position	Ch T-1	Eff Factor	10^5 n/s	M	Ch T-2	Eff Factor	10^5 n/s	M
V 0.00	20295	1.29×10^{-5}	435.25	26.26	25709	$.969 \times 10^{-5}$	415.12	25.05
H 0.00	337.4				428.40			

T/C's Room = 73 #2 = 100 #3 = 104

Assembly N-5: Pu to Pu = 1.25 cm

Lateral Spacing: 0.69 fixed + .560 = 1.250 cm

Vertical Spacing: 0.442 fixed = .442 cm

Parts: Same as N-1

Base Rate: 16.57×10^{-5} n/s

V 0.00	9866/2	1.29×10^{-5}	101.76	6.14	12668/2	$.969 \times 10^{-5}$	102.30	6.17
H 9.518	78.88				105.57			

T/C's Room = 73 #2 = 92 #3 = 97

V 0.00	15223/2	1.29×10^{-5}	163.65	9.88	20049/2	$.969 \times 10^{-5}$	161.90	9.77
H 2.986	126.86				167.08			

T/C's Room = 73 #2 = 91 #3 = 95

V 0.00	33642/2	1.29×10^{-5}	361.7	21.83	43899/2	$.969 \times 10^{-5}$	354.50	21.39
H .729	280.35				365.83			

T/C's Room = 73 #2 = 91 #3 = 95

V 0.00	34139	1.29×10^{-5}	733.58	44.30	44338	$.969 \times 10^{-5}$	716.05	43.21
H .120	568.98				738.96			

T/C's Room = 73 #2 = 91 #3 = 95

V 0.00	44804	1.29×10^{-5}	963.3	58.1	58252	$.969 \times 10^{-5}$	940.76	56.77
H 0.00	746.73				970.86			

T/C's Room = 73 #2 = 91 #3 = 95

Assembly N-6 : Pu to Pu = 1.150 cm

Lateral Spacing: 0.69 fixed * .460 = 1.150 cm

Vertical Spacing: 0.492 fixed = .492 cm

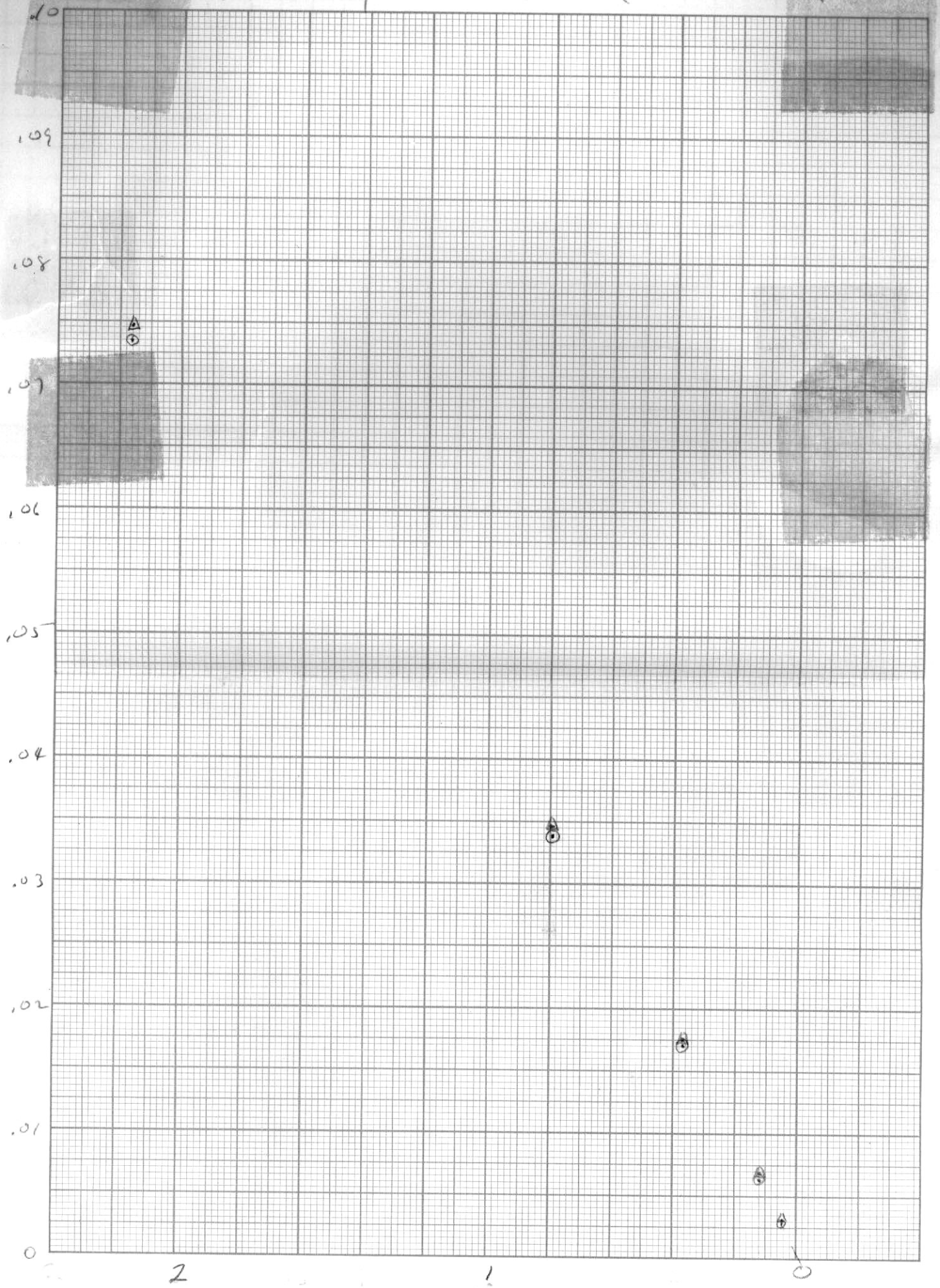
Parts : Same as N-1

Base Rate : 16.57×10^5 n/s

Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff Factor	10^5 n/s	M
V 0.000	97911/2	1.29×10^5	105.25	6.35	130578/2	$.969 \times 10^5$	105.81	6.36
H 9.520	81.59				108.78			
T/C's		Room = 73			#2 = 100		#3 = 100	
V 0.000	23684/2	1.29×10^5	254.61	15.37	30445/2	$.969 \times 10^5$	245.84	14.84
H 1.644	197.37				253.71			
T/C's		Room = 73			#2 = 99		#3 = 99	
V 0.00	29902	1.29×10^5	642.88	38.8	38809	$.969 \times 10^5$	626.76	37.82
H .403	498.36				646.81			
T/C's		Room = 73			#2 = 98		#3 = 98	
V 0.00	52792	1.29×10^5	1135.02	68.5	68592	$.969 \times 10^5$	1107.8	66.9
H .134	879.86				1143.2			
T/C's		Room = 73			#2 = 97		#3 97	
V 0.00	90552	1.29×10^5	1947.0	117.5	112613	$.969 \times 10^5$	1809.9	109.2
H 0.00	1509.3				1876.8			
T/C's		Room = 73			#2 = 97		#3 = 97	

The actuator was put in place for this run.
A = 7.980 cm

2 x 2 x 1 Array Pu to Pu = 1.05-0 cm



M-1

358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH
KEUFFEL & ESSER CO.

5-5-66

Assembly N-7: P_a to P_a = 1.050 cm

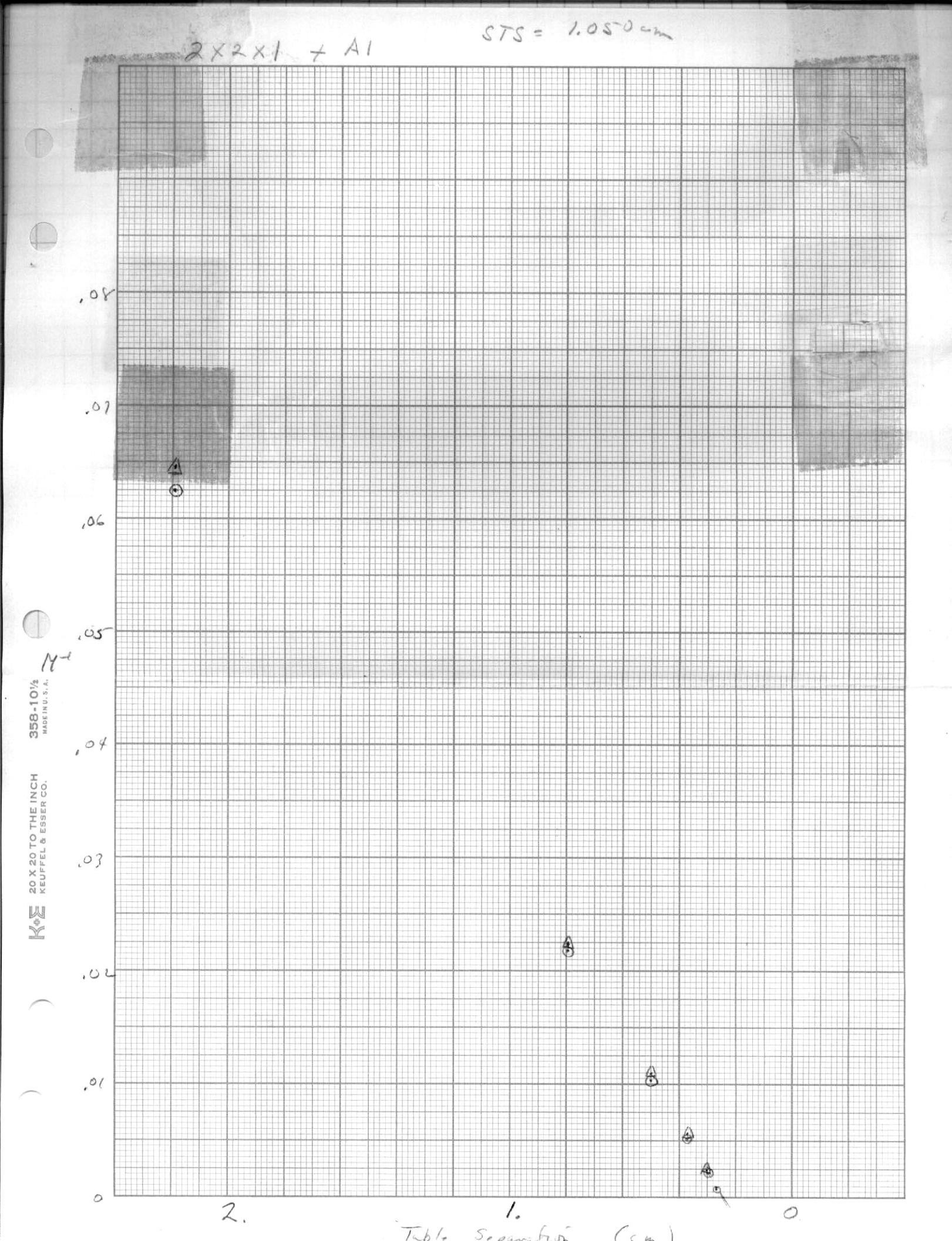
Lateral Spacing: 0.680 fixed + .360 = 1.050 cm

Vertical Spacing: 0.442 fixed = .442 cm

Parts: Same as N-1

Base Rate = 16.57 $\times 10^{-5}$ m/s

Position	Ch_2 T-1	Eff Factor	10^{-5} m/s	M	Ch_2 T-2	Eff Factor	10^{-5} m/s	M
V 0.00	9995/2	1.29×10^{-5}	107.46	6.49	13257/2	$.969\times10^{-5}$	107.07	6.46
H 9.513	83.3				110.5			
T/C's	Room = 73.5				#2 = 105		#3 = 96	
V 0.00	20998/2	1.29×10^{-5}	225.7	13.6	27410/2	$.969\times10^{-5}$	221.3	13.4
H 2.208	174.98				228.42			
T/C's	Room = 73				#2 = 102		#3 = 93	
V 0.00	45555/2	1.29×10^{-5}	489.7	29.6	59271/2	$.969\times10^{-5}$	478.2	28.9
H .798	379.6				493.5			
T/C's	Room = 74				#2 = 100		#3 = 93	
V 0.00	90527/2	1.29×10^{-5}	973.2	58.7	117127/2	$.969\times10^{-5}$	945.8	57.1
H .366	759.4				976.1			
T/C's	Room = 74				#2 = 100		#3 = 92.5	
V 0.00	118765	1.29×10^{-5}	2553.	154.1	150625	$.969\times10^{-5}$	2435.8	147.0
H .121	1978.4				2510.4			
T/C's	Room = 74				#2 = 99		#3 = 92	
V 0.00	265369	1.29×10^{-5}	5705.	348.3	329753	$.969\times10^{-5}$	5325.	321.4
H .043	4422.8				5495.8			
T/C's	Room = 74				#2 = 99		#3 = 92	
V 0.00	861271	1.29×10^{-5}	18517.	1118.	1073579	$.969\times10^{-5}$	17337.	1046.
H 0.000	14354.5				17892.		$\bar{M}$ = 1082	
A 7.980								
T/C's	Room = 73				#2 = 98.5		#3 = 91	


2×2×1 + Al
STS = 1.050 cm
.08
.07
.06
.05
.04
.03
.02
.01
0
N-1
2.
1.
0
Table Separation (cm)
358-10½
MADE IN U.S.A.
20 X 20 TO THE INCH
KEUFFEL & ESSER CO.

We added another thickness of Al to the four Cols. of the 2x2x1 array to try to determine the effect of the Al in the array.

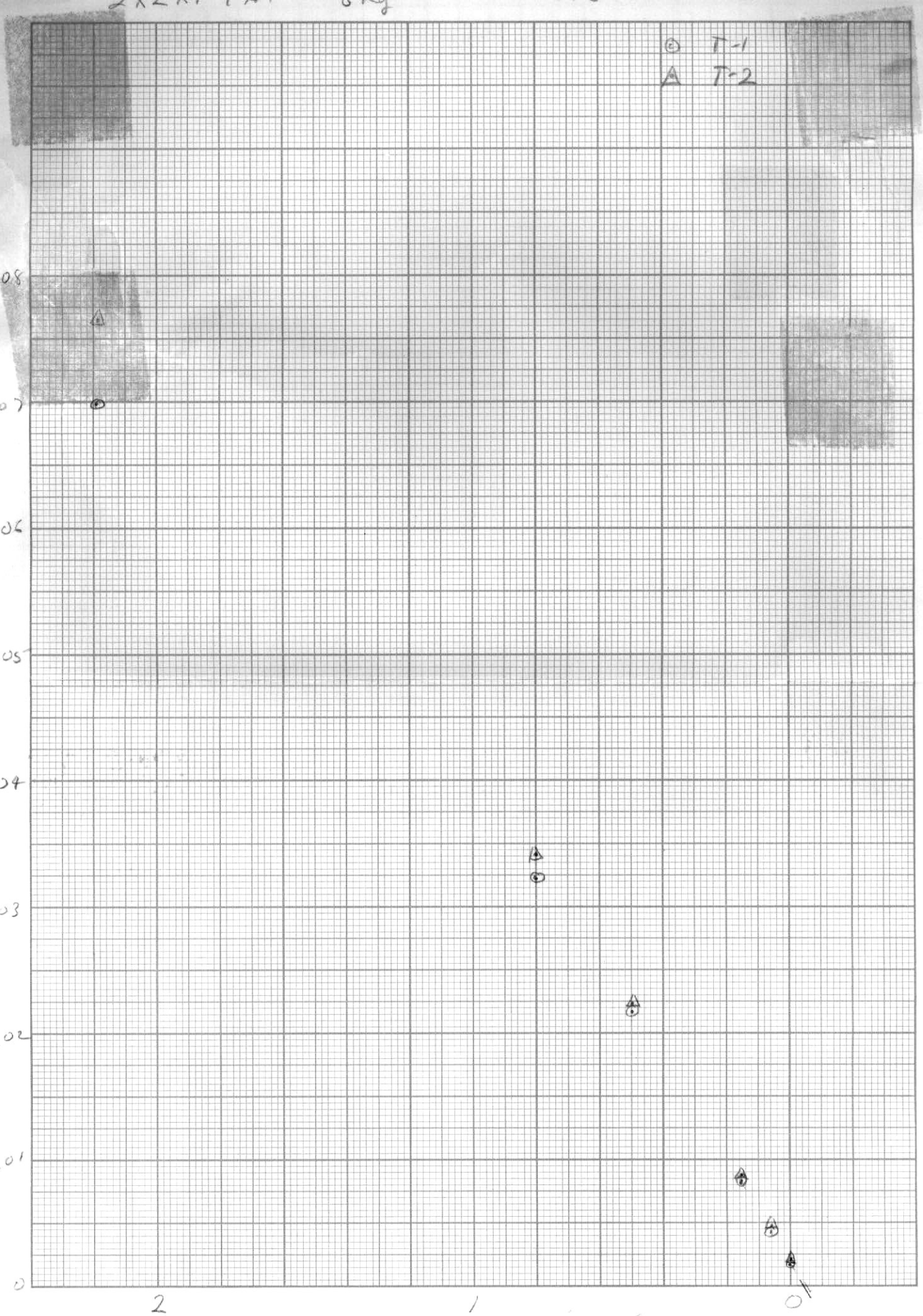
We will now close assembly N-7.

Assembly N-7' : Assembly N-7 + another thickness of Al around each Col.

Actuator = 7.980 cm

	Position	Ch_2T-1	Eff. Factor	10^5 n/s	M	Ch_2T-2	Eff. Factor	10^5 n/s	M
V	0.000	109072	1.29×10^{-5}	1117.25	7.08	137142	$.969\times10^{-5}$	1110.74	6.68
H	9.530	90.89				114.28			
V	0.000	246662	1.29×10^{-5}	2665.16	16.0	318802	$.969\times10^{-5}$	2574	15.5
H	2.195	2055.5				2656.7			
V	0.000	351559	1.29×10^{-5}	7555.9	45.6	44930	$.969\times10^{-5}$	7256	43.8
H	0.798	5855.98				7488.3			
V	0.000	73586	1.29×10^{-5}	15820	95.5	93542	$.969\times10^{-5}$	15107	91.2
H	.999	1226.4				1559.0			
V	0.000	189078	1.29×10^{-5}	32061	193.4	185893	$.969\times10^{-5}$	30013	181.1
H	.371	2484.6				3097.3			
V	0.000	348182	1.29×10^{-5}	74859	451.8	427877	$.969\times10^{-5}$	69101	417.0
H	.299	5803.0				7131.2			
V	0.000	1106812	1.29×10^{-5}	237955	1436	1337099	$.969\times10^{-5}$	215933	1303
H	.266	18496.				22284.			

2x2x1 + Al 6 Kg STS = 1.180

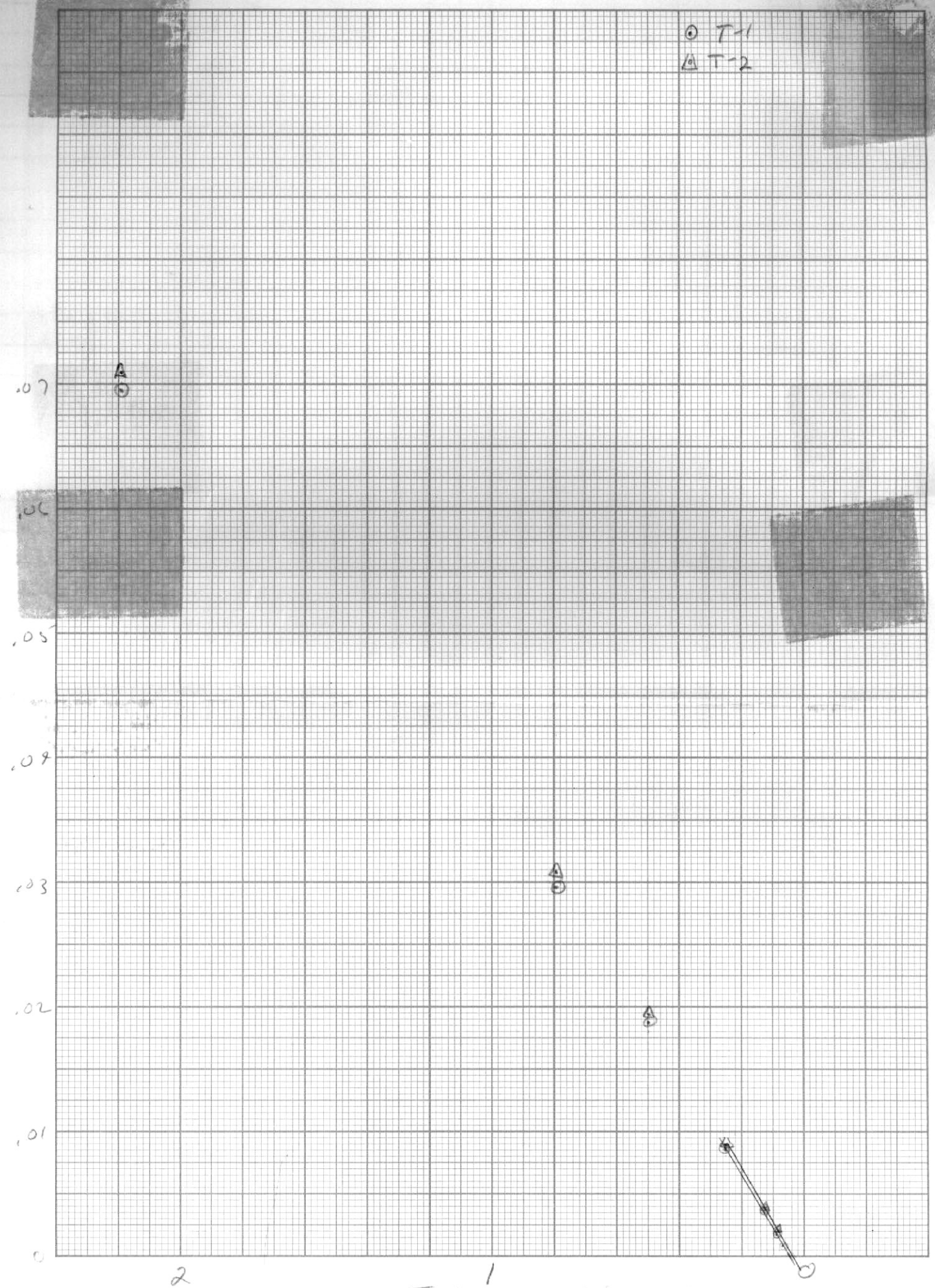


M-1

K+E 20 X 20 TO THE INCH KEUFFEL & ESSER CO. 358-10½ MADE IN U.S.A.

2×2×1 +Al 6Kg

STS = 1.15⁻⁸cm



M-1

KEUFFEL & ESSER CO. 20 X 20 TO THE INCH 358-10½ MADE IN U.S.A.

5-6-66

Assembly N-9: Pu to Pu = 1.158 cm

Lateral Spacing: 0.69 fixed + .468 cm = 1.158 cm

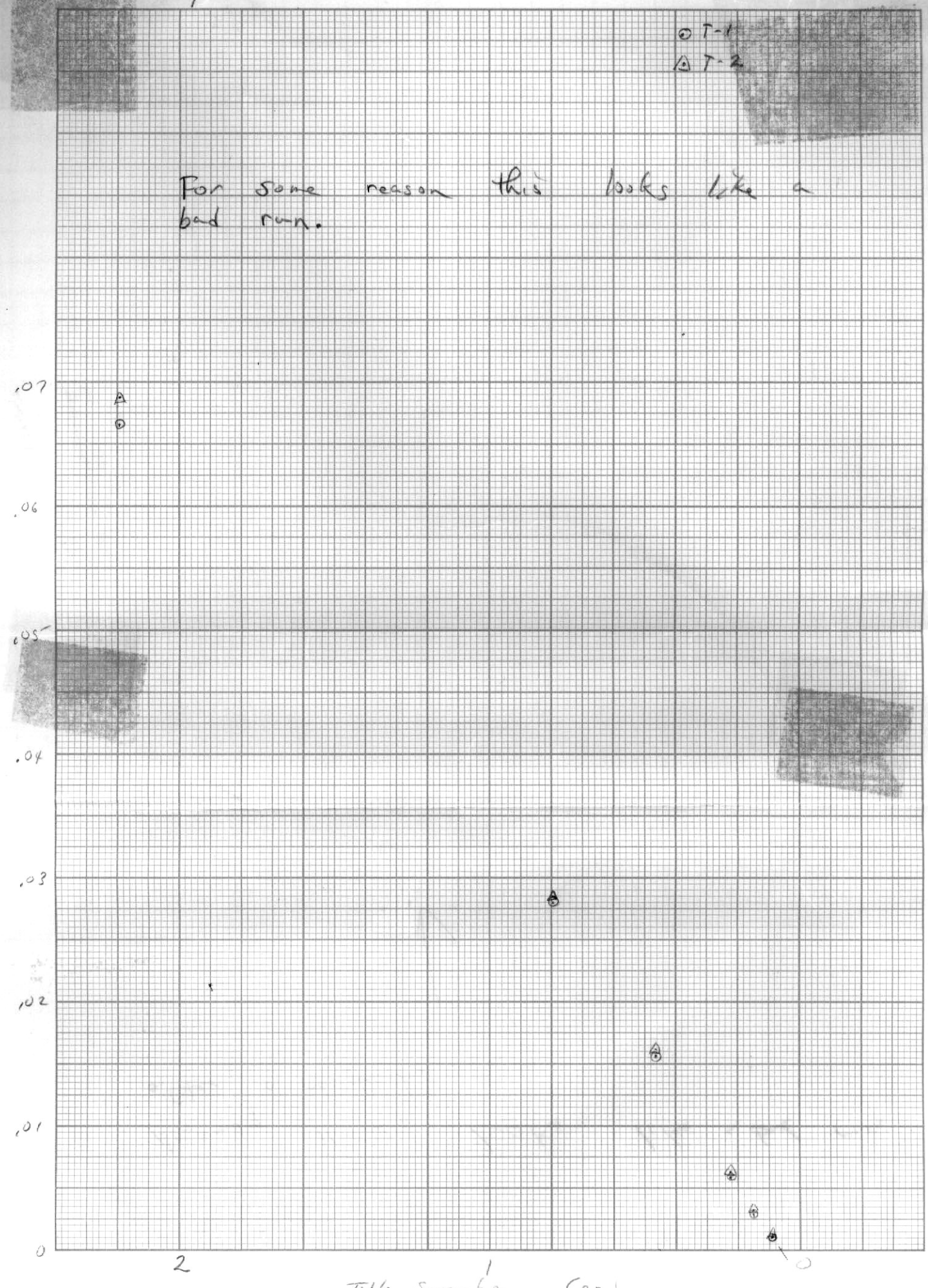
Vertical Spacing: 0.492 fixed = .492 cm

Parts: Same as N-1

Base Rate = 16.57×10^{-5} 1/s

Position	Cf_3T-1	EFR Factor	10^5 1/s	M	Cf_3T-2	EFR Factor	10^5 1/s	M
V 0.00	10368/2	1.25×10^{-5}	111.42	6.73	13567/2	$.968 \times 10^{-5}$	109.56	6.61
H 9.530	86.37				113.06			
A 7.980								
V 0.00	22170/2	1.25×10^{-5}	238.3	14.38	28926/2	$.968 \times 10^{-5}$	233.58	14.10
H 2.195	184.75				241.05			
A 2.98								
V 0.00	26019	1.25×10^{-5}	559.4	33.76	33389	$.968 \times 10^{-5}$	539.4	32.55
H .799	433.65				556.65			
A 7.980								
V 0.00	41181	1.25×10^{-5}	885.4	53.4	52691	$.968 \times 10^{-5}$	851.0	51.4
H .499	686.35				878.2			
A 7.980								
V 0.00	89926	1.25×10^{-5}	1934.5	116.7	115523	$.968 \times 10^{-5}$	1866.5	112.6
H .298	1499.6				1926.2			
A 7.980								
V 0.000	208470	1.25×10^{-5}	4482.	270.5	259743	$.968 \times 10^{-5}$	4194.8	253.2
H .133	3474.5				4325.			
A 7.980								
V 0.000	418689	1.25×10^{-5}	9001.7	543.3	515268	$.968 \times 10^{-5}$	8321.5	502.2
H .095	6978.1				8587.7			
A 7.980								

Assembly N-10

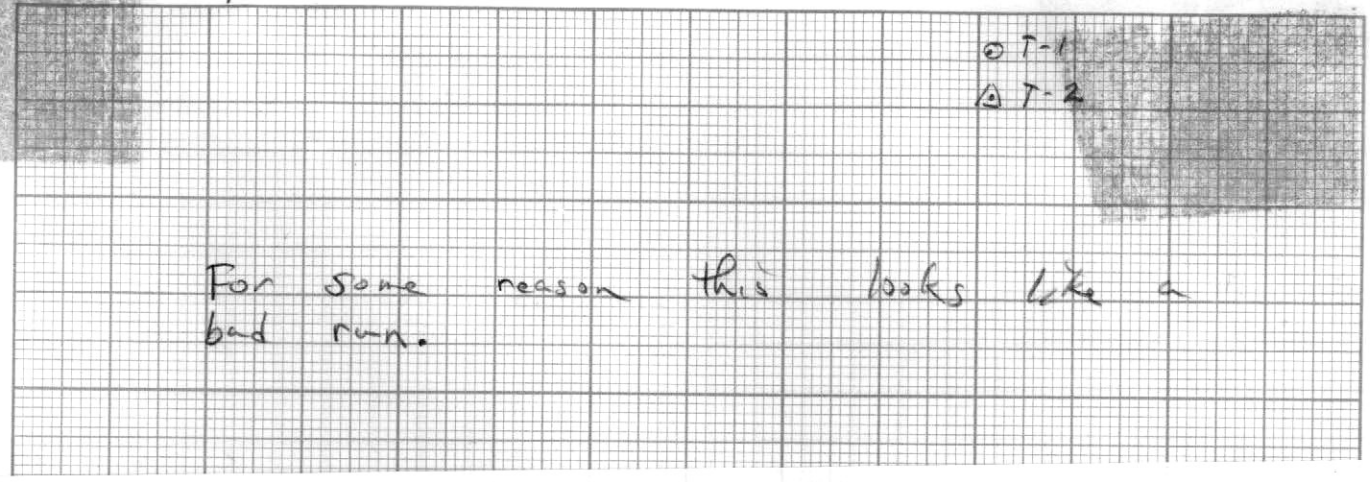


M-1

358-10½ MADE IN U.S.A.

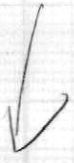
20 X 20 TO THE INCH KEUFFEL & ESSER CO.

Assembly N-10



For some reason this looks like a bad run.

Assembly N-10 looks like a bad run after a re-check.



Position	Cts T-1	Eff Factor	10^5 n/s	M	Cts T-2	Eff Factor	10^5 n/s	M
V 0.000	948186	1.29×10^5	20386.	1230.	1116078	$.969 \times 10^5$	18024.	1088
H .073	15803				18601			
A 7.980								

Assembly N-10: Pu to Pu = 1.130 cm

Lateral Spacing: 0.69 fixed + .440 = 1.130 cm

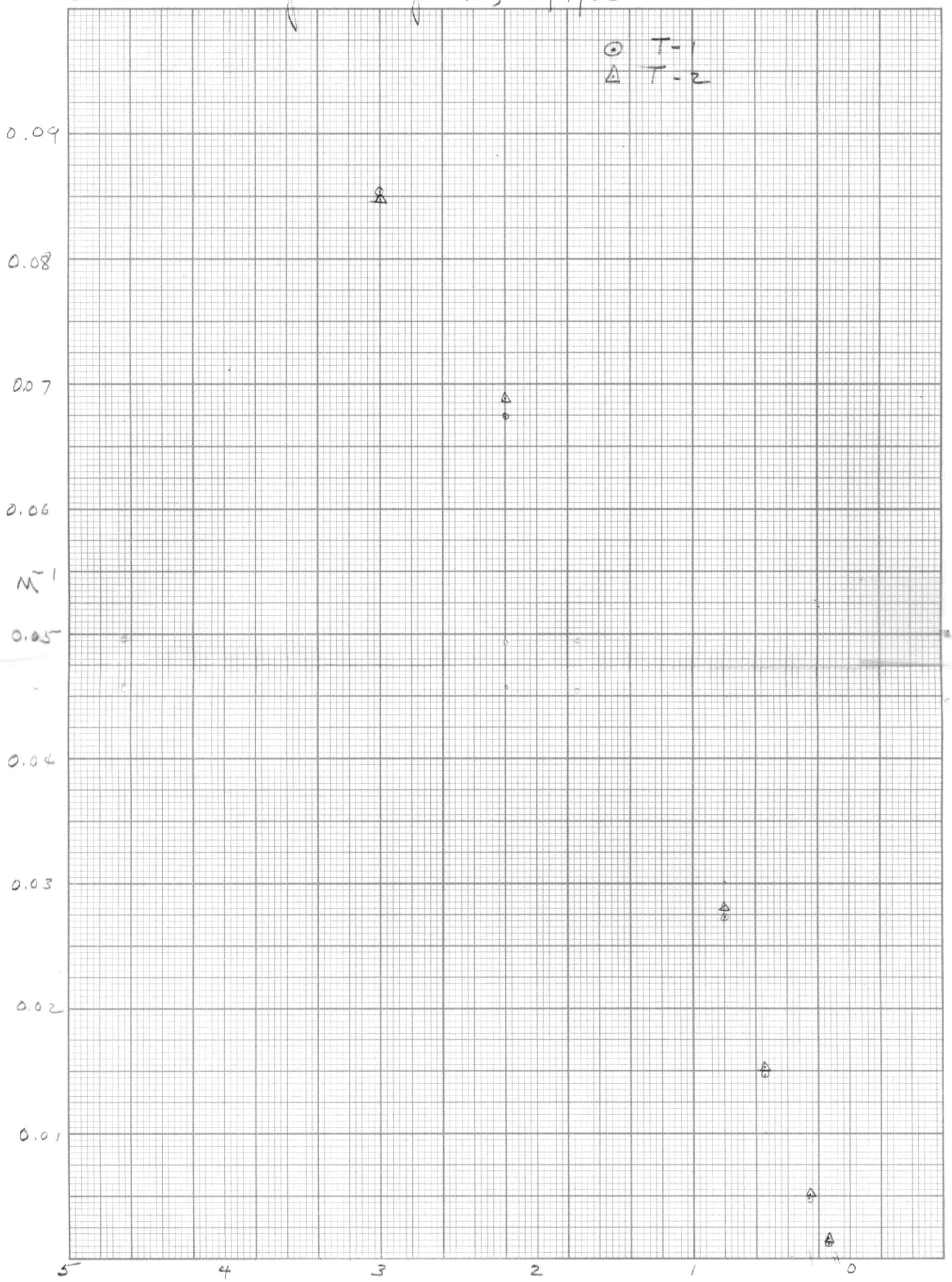
Vertical Spacing: 0.442 fixed = .442 cm

Parts: Same as N-1

Base Rate = 16.57×10^5 n/s

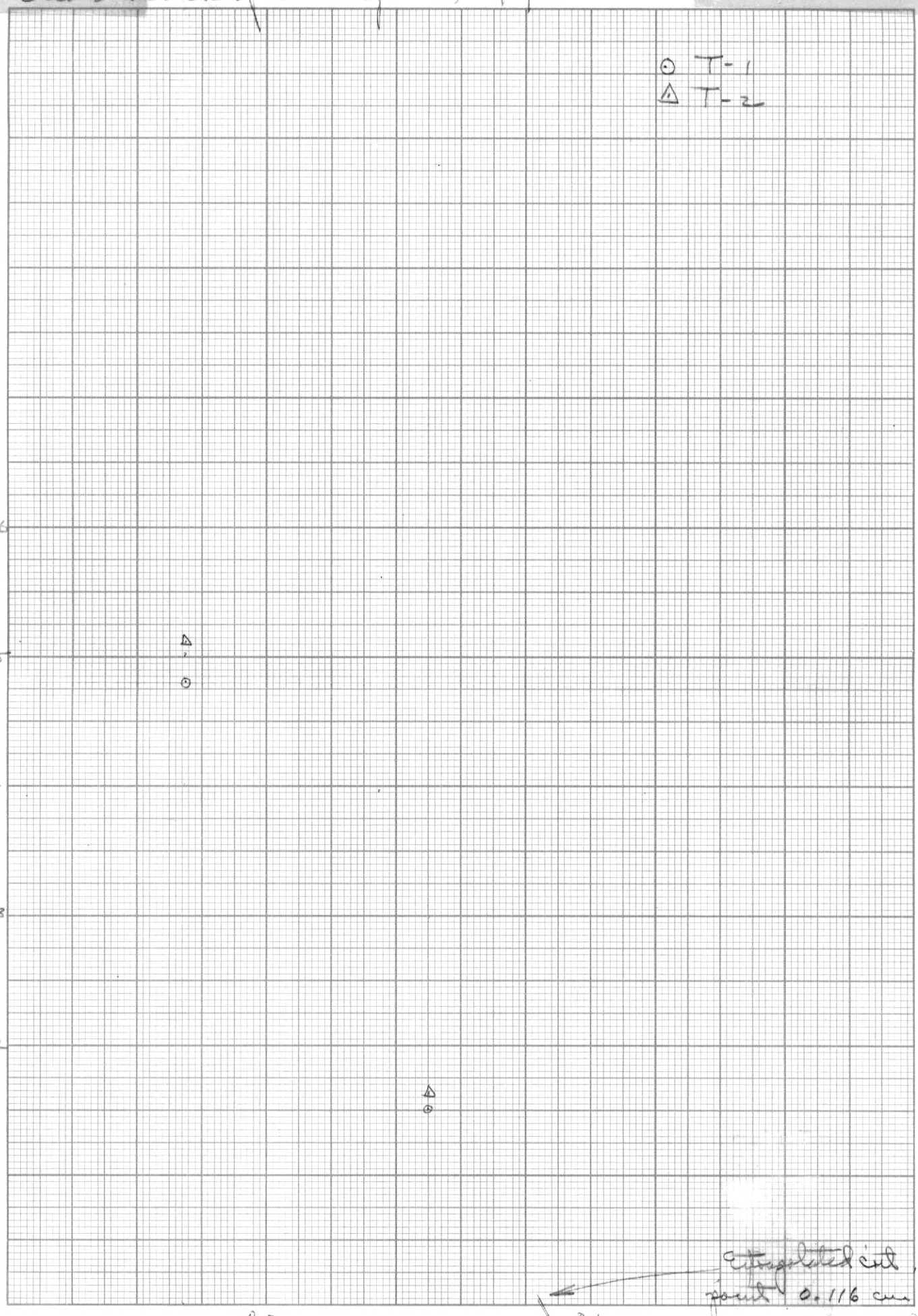
V	0.000	10653/2	1.29×10^5	114.53	6.91	13729/2	$.969 \times 10^5$	110.79	6.69
H	9.536	88.78				114.3			
A	7.980								
V	0.000	23170/2	1.29×10^5	249.1	15.0	25802/2	$.969 \times 10^5$	240.65	14.52
H	2.196	193.08				248.35			
A	7.980								
V	0.00	27485	1.29×10^5	590.9	35.7	35488	$.969 \times 10^5$	578.7	34.9
H	.795	458.1				597.2			
A	7.980								
V	0.00	49880	1.29×10^5	1064.6	64.2	62615	$.969 \times 10^5$	1011.2	61.0
H	.465	825.3				1043.6			
A	7.980								
V	0.00	132289	1.29×10^5	2844	171.6	164823	$.969 \times 10^5$	2662	160.7
H	.225	2205				2747			
A	7.980								
V	0.00	267956	1.29×10^5	5761	347.8	324417	$.969 \times 10^5$	5239	316.2
H	.150	4466				5407			
A	7.980								
V	0.00	725723	1.29×10^5	15603	942	829194	$.969 \times 10^5$	14522	876.
H	.090	12095				13987			
A	7.980								

Second reduction of Assembly N-10, 5/9/66



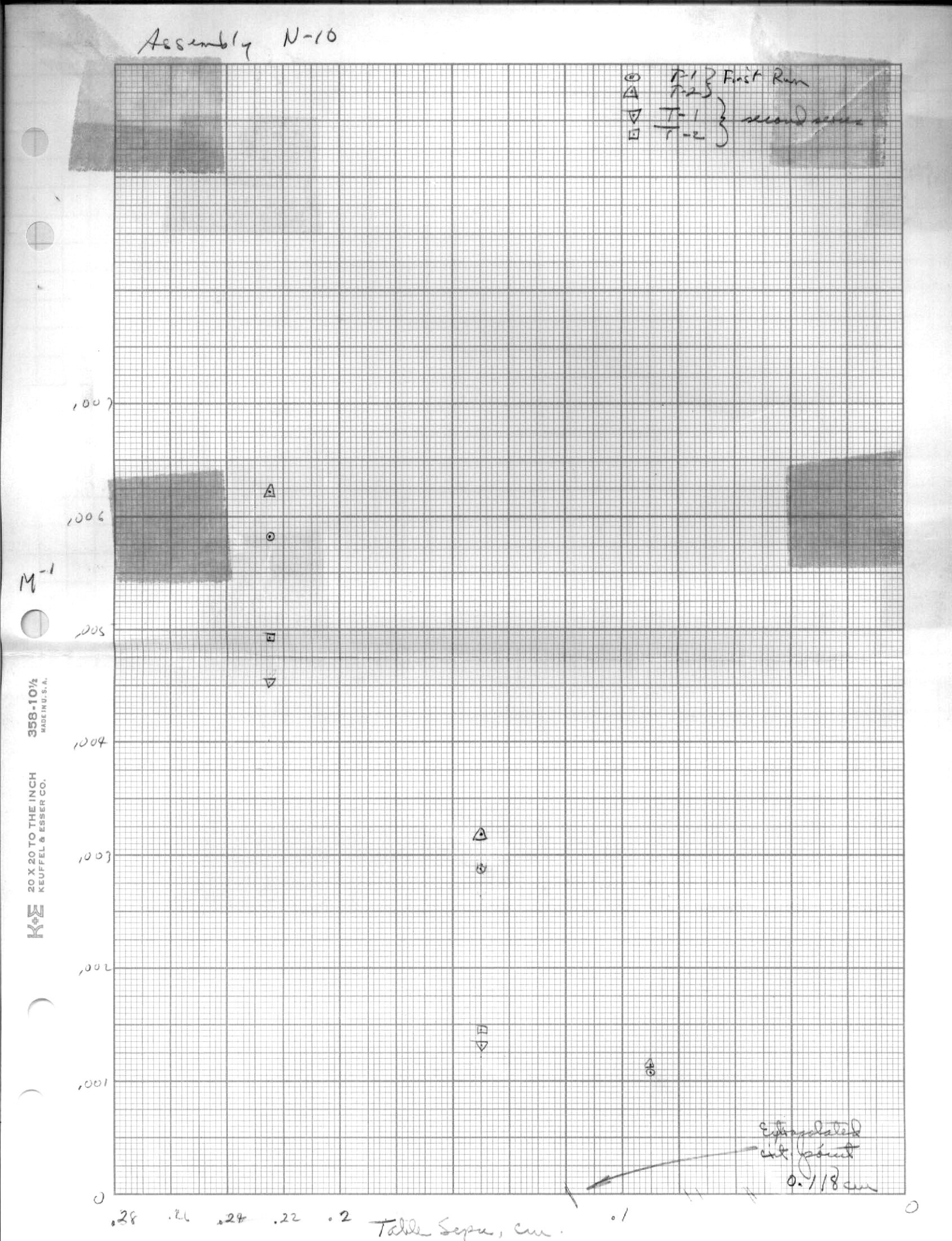
358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH KEUFFEL & ESSER CO.

Second recheck of Assembly N-10, 5/9/66



KE 20 X 20 TO THE INCH KEUFFEL & ESSER CO. 358-10½ MADE IN U.S.A.

Assembly N-10



We will re-check the last 4 points of Assembly N-10. B.R. 16.57×10^5 n/s

Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff. Factor	10^5 n/s	M
V 0.00	53803	1.29×10^5	1156.7	69.81	67838	$.969 \times 10^5$	1095.6	66.12
H .465	896.7				1130.63			
V 0.00	170525	1.29×10^5	3666	221.2	207744	$.969 \times 10^5$	3355	202.5
H .225	2842.1				3462.4			
V 0.00	584633	1.29×10^5	12570	758.6	705765	$.969 \times 10^5$	11398	687.9
H .150	9743.9				11763			
V 0.00		1.29×10^5				$.969 \times 10^5$		
H .090								

Something is screwy!

~~This set looks somewhat better than the previous one - points are more consistent with last point of previous run. Let's do it again~~

Scram tested shock absorber before this experiment

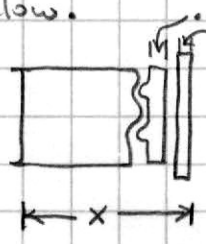
V 0.00	10579/2	1.29×10^5	113.7	6.86	13591/2	$.969 \times 10^5$	109.7	6.62
H 9.953	88.16				113.26			
A 7.985								
V 0.00	13712/2	1.29×10^5	147.4	8.90	17844/2	$.969 \times 10^5$	144.1	8.70
H 4.994	114.27				148.70			
V 0.00	9034	1.29×10^5	194.3	11.73	12114	$.969 \times 10^5$	195.6	11.80
H 3.001	150.6				201.9			
V 0.00	11447	1.29×10^5	246.1	14.85	14907	$.969 \times 10^5$	240.7	14.53
H 2.196	190.8				248.4			
V 0.00	28141	1.29×10^5	605.0	36.51	36382	$.969 \times 10^5$	587.6	35.46
H 0.799	469.0				606.4			
V 0.00	52486	1.29×10^5	1128	68.07	67439	$.969 \times 10^5$	1089	65.72
H 0.465	8747.7				1124			
V 0.00	160132	1.29×10^5	3443	207.8	200551	$.969 \times 10^5$	3239	195.5
H 0.225	2668.9				3343			
V 0.00	512920	1.29×10^5	11028	665.5	623834	0.969×10^5	10075	608.0
H 0.150	8549				10397			

Checked table separation at indicated 0.150 cm on DVM. Feeler gauges show 0.062 in (0.157 cm) so this should be O.K. Tables closed together properly.

Therefore it appears that the two latter runs are the correct ones and the first one was a bit off.

5-10-66

We checked and measured part #007 again as shown below.



Original X as measured by George E. = 2.235" in

First X measured after expansion = 2.255" in

X measured today = 2.250 in

We weighed the Al and steel in the assembly:

Col. 1 = 610. gms

Col. without Threads = 465. gms length = 16 5/8"

Bottom heat sink & Spacer = 120.5 gms (2 5/16" spacer only)

Bottom heat sink = 50. gms

Center spacer = 16.5 gms

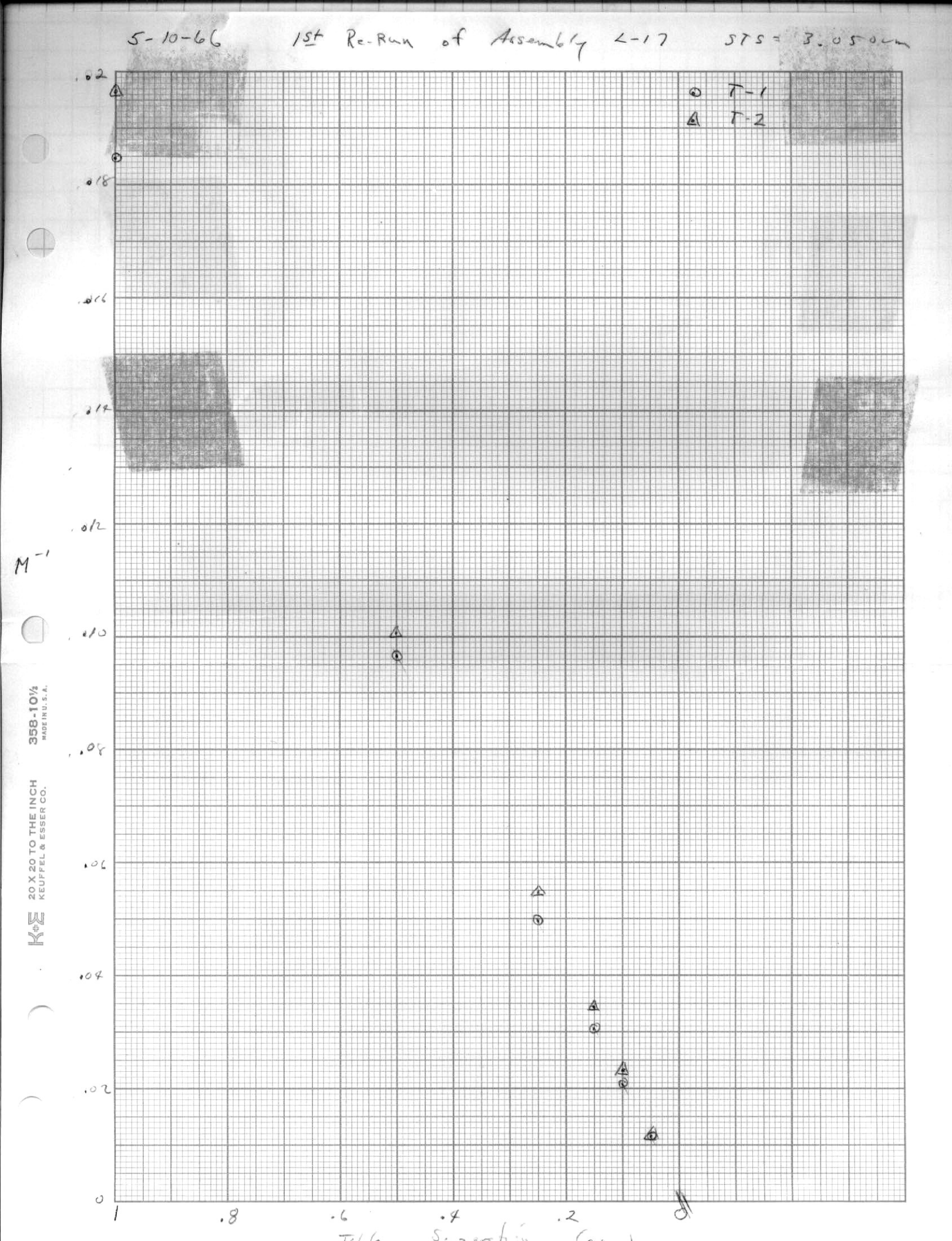
Base = 300. gms

Bolt + small washer (SS) = 62.5 gms

Washer (SS) = 158.5 gms

Outside Al tube = 416.5 gms length = 14 7/8"

5-10-66 1st Re-Run of Assembly L-17 STS = 3.050 cm



20 X 20 TO THE INCH
KEUFFEL & ESSER CO.
358-10½
MADE IN U.S.A.

We will re-run Assembly L-17 3^3 Array
Pu to Pu = 3.050 cm

Parts: Same as L-17

Base Rate = 55.78×10^{-5} n/s

Position	Ch 1 T-1	Eff. Factor	10^{-5} n/s	M	Ch 1 T-2	Eff. Factor	10^{-5} n/s	M
V 0.00	26680	1.29×10^{-5}	616.6	11.1	362577	$.969 \times 10^{-5}$	585.6	10.5
H 9.531	478.				604.3			
	T/C's	Room = 74			#2 = 110		#3 = 106	
V								
H								
V 0.00	576077	1.29×10^{-5}	1238.5	22.2	725320	$.969 \times 10^{-5}$	1171.7	21.0
H 3.000	960.1				1209.2			
	T/C's	Room = 74			#2 = 107		#3 = 104.5	
V 0.000	140434	1.29×10^{-5}	3019.2	54.1	175468	$.969 \times 10^{-5}$	2833.7	50.8
H 1.000	2340.5				2924.4			
	T/C's	Room = 74			#2 = 105		#3 = 103.5	
V 0.000	261776	1.29×10^{-5}	5757.	103.2	328209	$.969 \times 10^{-5}$	5300.6	95.0
H 0.500	4462.9				5470.1			
	T/C's	Room = 73.5			#2 = 105		#3 = 102	
V 0.000	523615	1.29×10^{-5}	1125.8	201.8	629689	$.969 \times 10^{-5}$	10168.6	182.3
H 0.250	8726.9				10493.9			
	T/C's	Room = 73			#2 = 104		#3 = 102	
V 0.00	845351	1.29×10^{-5}	18174.9	325.8	1008259	$.969 \times 10^{-5}$	16283.	291.9
H 0.150	14089.1				16804.			
	T/C's	Room = 73			#2 = 104		#3 = 102	
V 0.00	1241200	1.29×10^{-5}	26685	478.4	1499180	$.969 \times 10^{-5}$	24211	434.
H 0.100	20686				24986			
	T/C's	Room = 73			#2 = 104		#3 = 101	
V 0.000	2224052	1.25×10^{-5}	47816	857.2	3057980	$.969 \times 10^{-5}$	49386.	885
H 0.049	37067				50966			
Maybe Critc	T/C's	Room = 73			#2 = 104		#3 = 101	

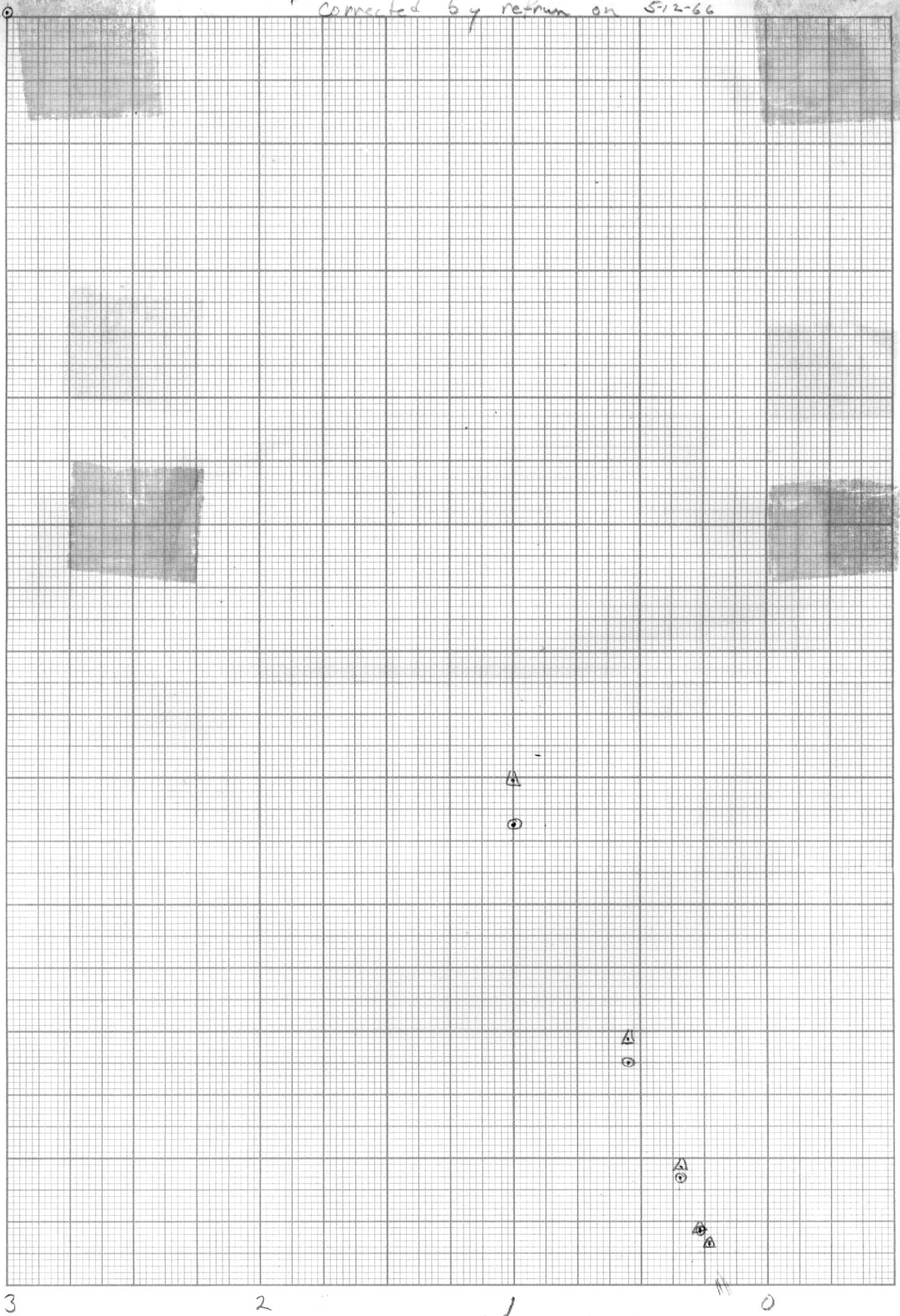
5-11-66

2nd Re-Run of Assembly L-17 : Pu to Pu = 3.050cm

Base Rate = 55.78 X 10^{-5} m/s

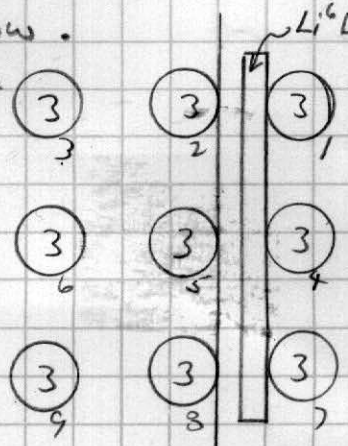
Position	Ch T-1	Eff. Factor	10^{-5} m/s	M	Ch T-2	Eff. Factor	10^{-5} m/s	M
V 0.000	29419	1.29×10^{-5}	632.5	11.3	36580	$.969 \times 10^{-5}$	590.8	10.6
H 9.535	490.31				609.7			
A 15.000								
	T/C's	Room = 73			#2 = 112		#3 = 108	
V 0.000	58861	1.29×10^{-5}	1265.5	22.7	72554	$.969 \times 10^{-5}$	1171.7	21.0
H 2.999	981.0				1209.2			
	T/C's	Room = 73			#2 = 106		#3 = 103	
V 0.000	144167	1.29×10^{-5}	3099.5	55.6	176161	$.969 \times 10^{-5}$	2845.0	51.0
H 1.000	2402.7				2936.0			
	T/C's	Room = 73			#2 = 105		#3 = 102	
V 0.000	270255	1.29×10^{-5}	5810.4	104.2	328468	$.969 \times 10^{-5}$	5308.7	95.1
H 0.50	4504.2				5479.4			
	T/C's	Room = 73			#2 = 105		#3 = 102	
V 0.000	531326	1.29×10^{-5}	11423.5	204.8	632918	$.969 \times 10^{-5}$	10222.	183.3
H 0.250	8855.4				10549.			
	T/C's	Room = 73			#2 = 104.5		#3 = 101.5	
V 0.000	868912	1.29×10^{-5}	18681.5	338.9	1031318	$.969 \times 10^{-5}$	16653.	298.6
H 0.150	14481.8				17188			
	T/C's	Room = 73			#2 = 104		#3 = 101	
V 0.000	1230447	1.29×10^{-5}	26457.	478.3	1488004	$.969 \times 10^{-5}$	24031.	430.8
H 0.100	20507				24800			
	T/C's	Room = 73			#2 = 103.5		#3 = 100	
V 0.000	2198682	1.29×10^{-5}	47271	847.5	3017786	$.969 \times 10^{-5}$	48737	873.7
H 0.050	36644				50296			
	T/C's	Room = 73.5			#2 = 103		#3 = 100	

5-11-66 Assembly L-17 with L.[illegible]D STS 3.050 cm
Corrected by return on 5-12-66



K+E 20 X 20 TO THE INCH KEUFFEL & ESSER CO. 358-10½ MADE IN U.S.A.

We will now placed Li^6D in Assembly L-17. The Li^6D has the dimensions of 12" X 18" X .5" and is placed in the assembly as shown below. The Assembly will be closed to determine the effect of the Li^6D.



Position	Ch T-1	Eff Factor	10^5 n/s	M	Ch T-2	Eff Factor	10^5 n/s	M
V 0.00	30634	1.25×10^{-5}	654.7	11.8	37835	$.868 \times 10^{-5}$	611.1	11.0
H 9.531	5-10.6				630.6			
A 15.00								
	T/C's	Room = 73.5			#2 = 109		#3 = 108	
V 0.000	64178	1.25×10^{-5}	1379.8	24.7	78576	$.868 \times 10^{-5}$	1269.0	22.8
H 3.000	1069.6				1309.6			
	T/C's	Room = 73			#2 = 107		#3 = 103	
V 0.000	179108	1.25×10^{-5}	3850.8	69.0	217489	$.868 \times 10^{-5}$	3512.4	63.0
H 1.000	2985.1				3624.8			
	T/C's	Room = 73			#2 = 106		#3 = 102	
V 0.000	370288	1.25×10^{-5}	7961.1	142.7	445624	$.868 \times 10^{-5}$	7196.8	129.0
H .550	6171.4				7427.			
	T/C's	Room = 73			#2 = 105		#3 = 101	
V 0.000	760182	1.25×10^{-5}	16344	293.0	930735	$.868 \times 10^{-5}$	15031.	269.5
H .398	12669.7				15512			
	T/C's	Room = 73			#2 = 105		#3 = 101	
V 0.000	1537784	1.25×10^{-5}	33061	592.7	2007384	$.868 \times 10^{-5}$	32419	581.2
H .254	25629				33456			
	T/C's	Room = 73			#2 = 105		#3 = 101	
V 0.000	2042591	1.25×10^{-5}	43915	787.2	2681514	$.868 \times 10^{-5}$	43306	776.1
H .232	34043				44691			
	T/C's	Room = 73			#2 = 104.5		#3 = 100.5	

* T-1 and T-2 had their pulses clipped. We will return to original system with only T-2 clipped and re-count

The Li^6D was removed from the assembly and 3 Al Cols. were placed on col. 1, 4 and 7 for a safety measurement for placing additional Al around the other Cols.

Assembly L-17-Al : Pu to Pu = 3.05 cm

Base Rate = 55.78×10^{-5} n/s

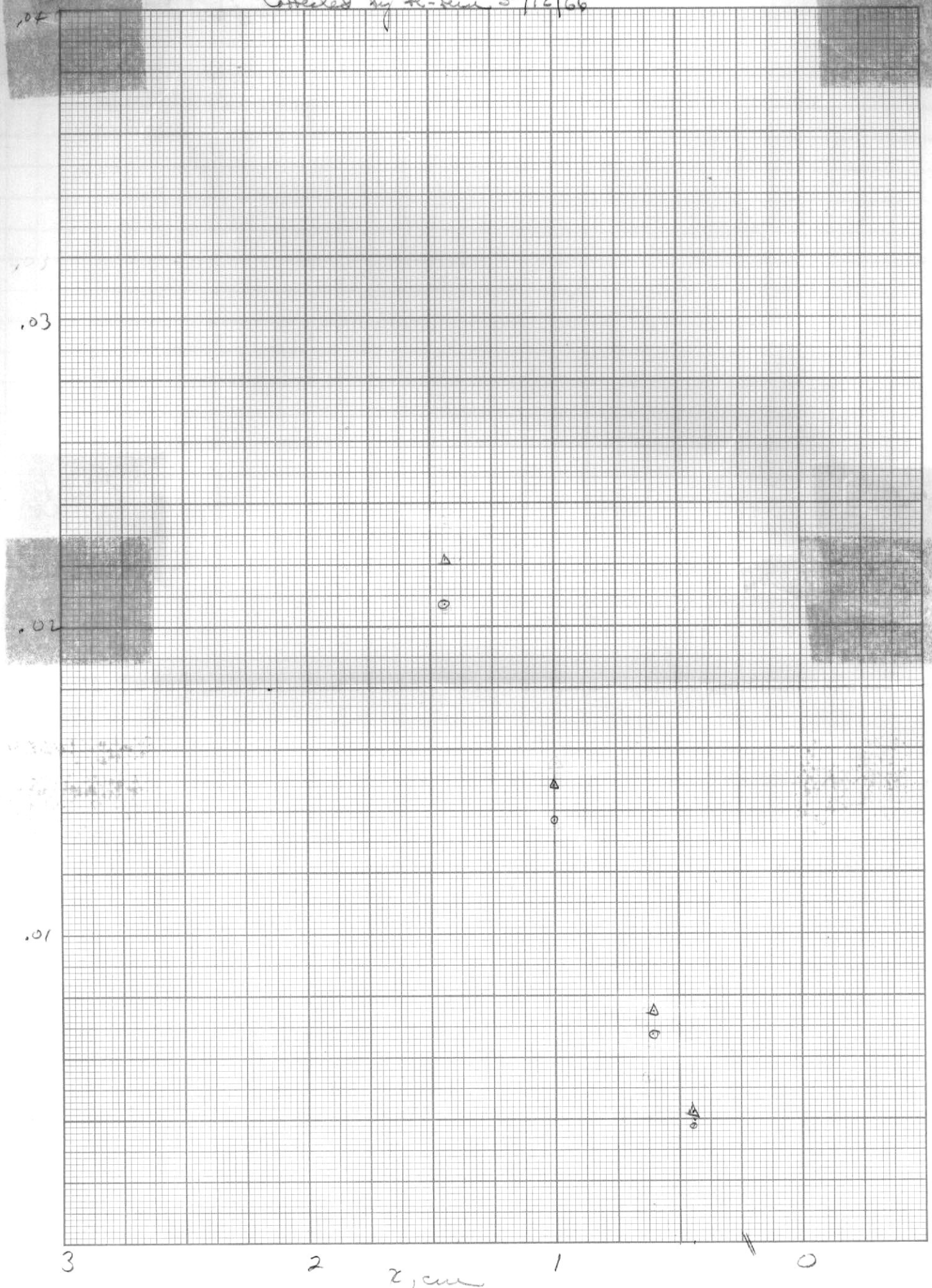
Position	Ch T-1	Eff. Factor	10^5 n/s	M	Ch T-2	Eff. Factor	10^5 n/s	M
V 0.000	30239	1.29×10^{-5}	650.2	11.7	36065	$.868 \times 10^{-5}$	582.5	10.4
H 9.53	50740				60101			
A 15.00								
V 0.000	65218*	1.29×10^{-5}	1402.	25.1	70538*	$.869 \times 10^{-5}$	1220.	21.9
H 2.998	108770				125890			
* other page								
V 0.00	63990	1.29×10^{-5}			75828	$.969 \times 10^{-5}$		
H 2.998								
V 0.000	126355	1.29×10^{-5}	2716.7	48.7	148071	$.969 \times 10^{-5}$	2391.3	42.9
H 1.438	21060				246780			
V 0.000	192317	1.29×10^{-5}	4134.	74.1	222884	$.969 \times 10^{-5}$	3599.8	64.5
H 1.000	32050				37150			
V 0.000	408852	1.29×10^{-5}	8790.	1157.6	477702	$.969 \times 10^{-5}$	7230.4	129.6
H .601	68140				774617			
V 0.000		1.29×10^{-5}				$.969 \times 10^{-5}$		
H .445								

We are having trouble with T-1. We will SHUT DOWN and look at it tomorrow

5-11-66

Assembly L-17 + A1 SPS 3.050 cm

Corrected by re-run 5/12/66



358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH
KEUFFEL & ESSER CO.

5/12/66 55.78×10^5 n/s

Changed the amplifier on T-1. Repeat previous day's work to test counter responses. Flipped both sets of pulses. Re-set to maintain counter efficiencies L-17-A1

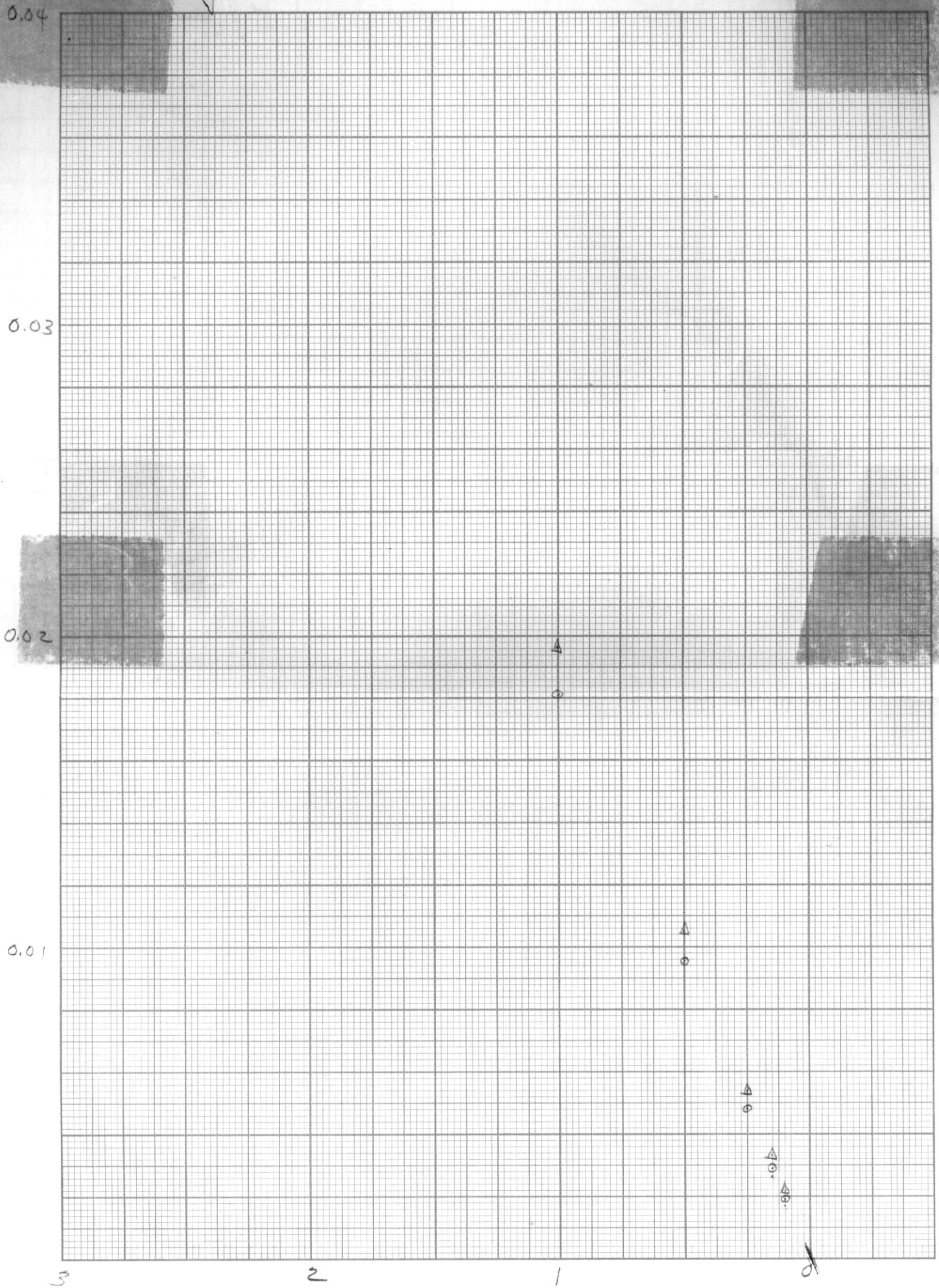
Position	Cts T-1	Eff factor	10^5 n/sec	M	Cts T-2	Eff factor	10^5 n/sec	M
V 0.00	29683	1.29×10^5	638.19	11.44	37496	0.969×10^5	605.56	10.86
H 9.541	494.72				624.93			
V 0.00	62771	—	1349.6	24.20	78857	—	1273.6	22.83
H 3.00	62417				78237			
	1046.2				1314.3			
V 0.00	124778	—	2682.7	48.09	155164	—	2505.9	44.92
H 1.43	125373				155154			
	2079.6				2586.1			
V 0.00	188791	—	4059.0	72.77	233064	—	3764.0	67.48
H 0.999	189207				232384			
	3146.5				3884.4			
V 0.00	384732	—	8271.7	148.3	464156	—	7496.1	134.4
H 0.601	387731				465475			
	6412.2				7735.9			
V 0.00	686059	—	14750	264.4	813269	—	13134	235.5
H 0.442	697327				827015			
	11434				13554			

Things look real good - no noise indications on T-1 this time

[redacted]

[redacted]

5/12/66 Assembly L-17 Re-run STS 3.050 cm



358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH KEUFFEL & ESSER CO.

3d Re-Run of Array L-17 Bare, STS = 3.050 cm
B.R 55.78 x 10^5 n/cc

Position	to T-1	Eff Factor	10^5 n/cc	M	to T-2	Eff Factor	10^5 n/cc	M
V 0.00	29344	1.29×10^5	630.9	11.31	36660	0.969×18^5	592.0	10.61
H 9.53	29472				36501			
	489.07				611.0			
V 0.00	58385	—	1255.5	22.50	72679	—	1173.7	21.04
H 3.000	58191				72558			
	973.08				1211.3			
V 0.00	143364	—	3082.3	55.26	175908	—	2840.9	50.93
H 1.000	142961				176264			
	2389.4				2931.8			

T/C's Room 70°F #2 - 110°F #3 - 109°F

V 0.00	270744	—	5821.0	104.4	329251	—	5317.4	95.33
H 0.500	271605				328699			
	4512.4				5487.5			

T/C's Room 71 #2 - 108 #3 - 108

V 0.00	534186	—	11484.9	205.9	638677	—	10314.6	184.9
H 0.251	532803				636940			
	8903.1				10644.6			

T/C's Room 71 #2 - 108 #3 - 107

V 0.00	887029	—	19071	341.9	1,044265	—	16864.5	302.3
H 0.149	900448				1,048,552			
	14784				17404			

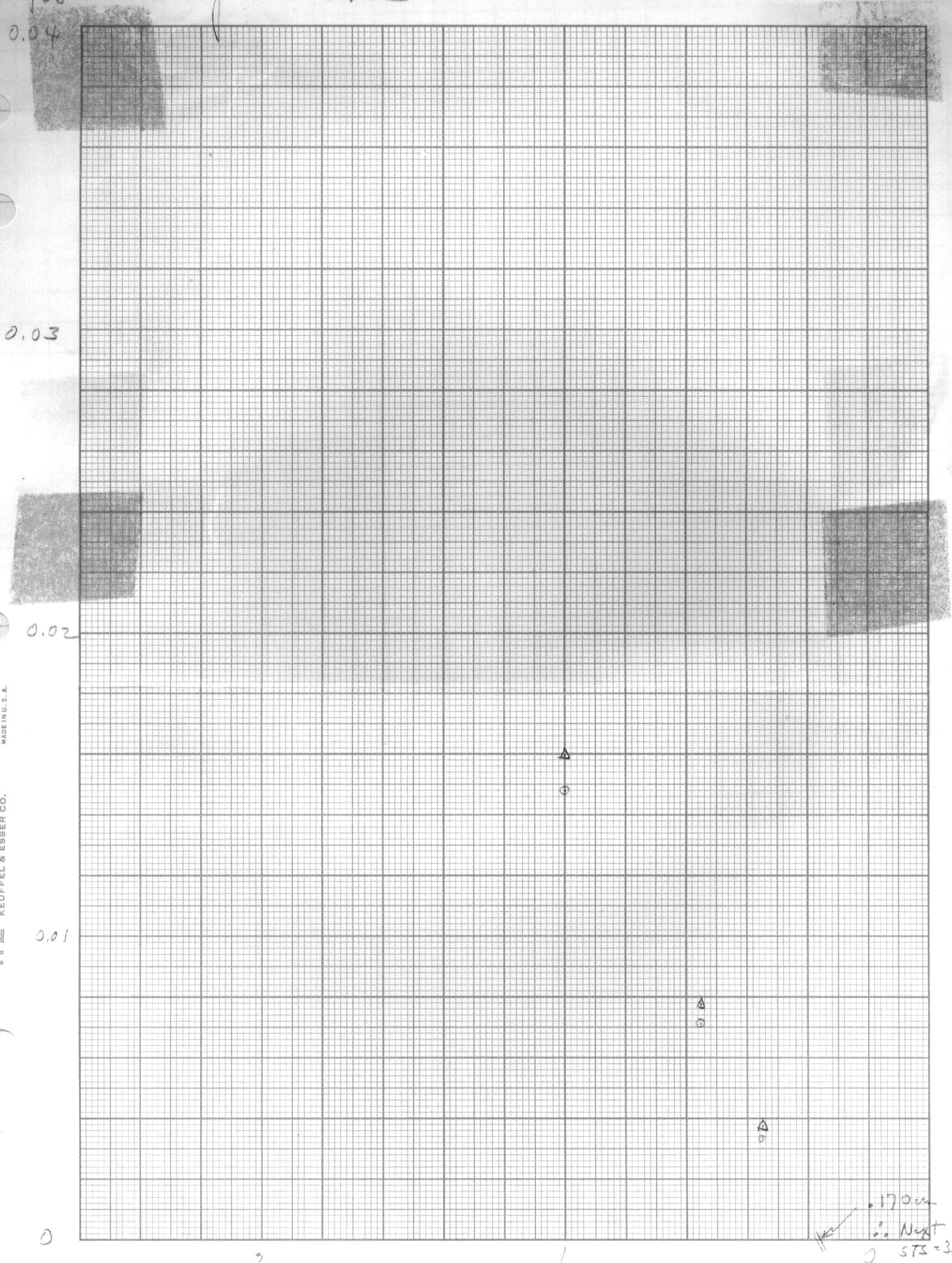
T/C's Room-71 #2 - 107 #3 - 106

V 0.00	1358002	—	28767	515.72	1,552,093	—	25066	449.4
H 0.100	1347173				1,560,926			
	22300				25868			

T/C's Room 72 #2 - 106 #3 - 106

Agreement between these and previous runs on this system appears to be about perfect.

5/12/66 Assembly L-17 + Li^6D STS 3.050



358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH KEUFFEL & ESSER CO.

Repeat of Assembly L-17 + ½" slab Li^6D, STS 3.050

B.R. 55.78×10^5 n/s (See p 80)

Position	to T-1	Eff. Factor	10^5 n/s	M	to T-2	Eff. Factor	10^5 n/s	M
V.00 H9.53	300S-1	1.29×10^5	646.0	11.58	37800	0.969×10^5	610.5	10.94
	30076				38216			
	500.8				630.0			
T/C's	Room - 71 °F				#2 - 116		#3 - 116	
V.00 H 2.998	62889	—		13S-2.2 24.24	78295	—	1264.5	22.67
	22814				78252			
	1048.2				1305			
T/C's	Room - 71				#2 - 113		#3 - 113	
V 0.00 H 0.999	175314	—	3769.2	67.57	216420	—	3495	62.66
	175590				216223			
	2921.9				3607			
T/C's	Room - 71				#2 - 112		#3 - 112	
V.0.00 H0.549	366638	—	7882.7	141.32	444406	—	7177.2	128.7
	368761				446422			
	6110.6				7406.8			
T/C's	Room - 71				#2 - 116		#3 - 116	
V 0.00 H 0.349	779157	—	16752	300.3	917742	—	14822	265.7
	827159				919610			
	12986				15296			
T/C's	Room - 71				#2 - 110		#3 - 111	
V 0.00 H0.255	215-7348	—			2017945	—		
	1782078				2013387			
T/C's	Room - 71				#2 - 109		#3 - 110	

This is just too high a count rate for accurate results reflects stability at lower count rate. Should try to work < 10^6 c/m

V. 00 Al 0.546	376781	—			456452	—		
	375740				455235			

Stability recovered well after a few minutes

Part #	Base Rate	Tube No.
115	2.07×10^{-5}	1
127	2.06	
119	2.10	
123	2.11	2
114	2.07	
001	2.03	
005	1.97	4
112	2.09	
110	2.03	
130	2.14	5
124	2.15	
128	2.13	
118	2.07	7
117	2.06	
006	2.02	
008	2.01	8
009	2.03	
100	2.10	

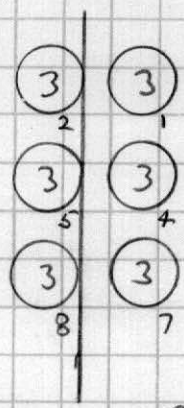
Base Rate = 37.25×10^{-5} g/s

5-13-66

We will do the safety experiments for putting Al around each Col. of the 3^3 array.

2/3 of Assembly L-17: Pu to Pu = 3.050 cm

Base Rate = 37.25×10^{-5} n/s



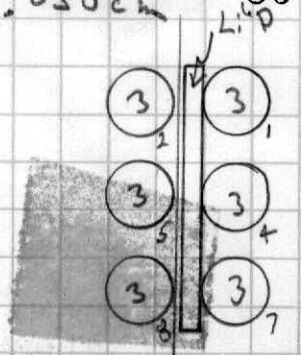
	Position	Ch 7-1	Eff. Factor	10^5 n/s	M	Ch 7-2	Eff. Factor	10^5 n/s	M
V	0.00	7778	1.29×10^{-5}	167.2	4.49	9939	$.969 \times 10^{-5}$	160.6	4.31
H	9.531	129.6				165.7			
A	15.00								
		T/C's	Room = 72			#2 - 107		#3 - 107	
V	0.00	15791	1.29×10^{-5}	333.1	8.94	20239	$.969 \times 10^{-5}$	326.8	8.77
H	0.00	258.2				337.3			
		T/C's	Room = 72			#2 - 106		#3 - 106	

2/3 of Assembly L-17 + Al on each col. STS = 3.050 cm

Base Rate = 37.25×10^{-5} n/s

V	0.00	8038	1.29×10^{-5}	172.8	4.64	10288	$.969 \times 10^{-5}$	166.2	4.46
H	9.539	7933				10575			
		133.97				171.5			
V	0.000	17714	1.29×10^{-5}	380.8	10.2	23035	$.969 \times 10^{-5}$	372.0	9.99
H	0.000	17766				22598			
		295.2				383.9			

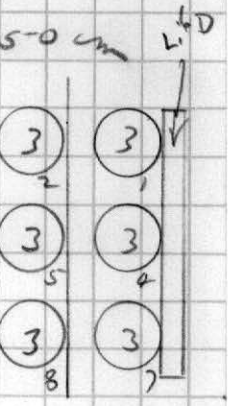
2/3 of Assembly L-17 + L.6D : STS = 3.050 cm



Base Rate = 37.25 $\times 10^{-5}$ n/s

Position	Ch T-1	Eff. Factor	10^{-5} n/s	M	Ch T-2	Eff. Factor	10^{-5} n/s	M
V 0.00	7930	1.29×10^{-5}	170.5	4.58	10411	$.969 \times 10^{-5}$	168.1	4.51
H 9.520	8140				10576			
A 15.00	132.17				173.5			
V 0.00	15990	1.29×10^{-5}	343.8	9.23	20621	$.969 \times 10^{-5}$	333.0	8.94
H 0.00	16115				20725			
	266.5				343.7			

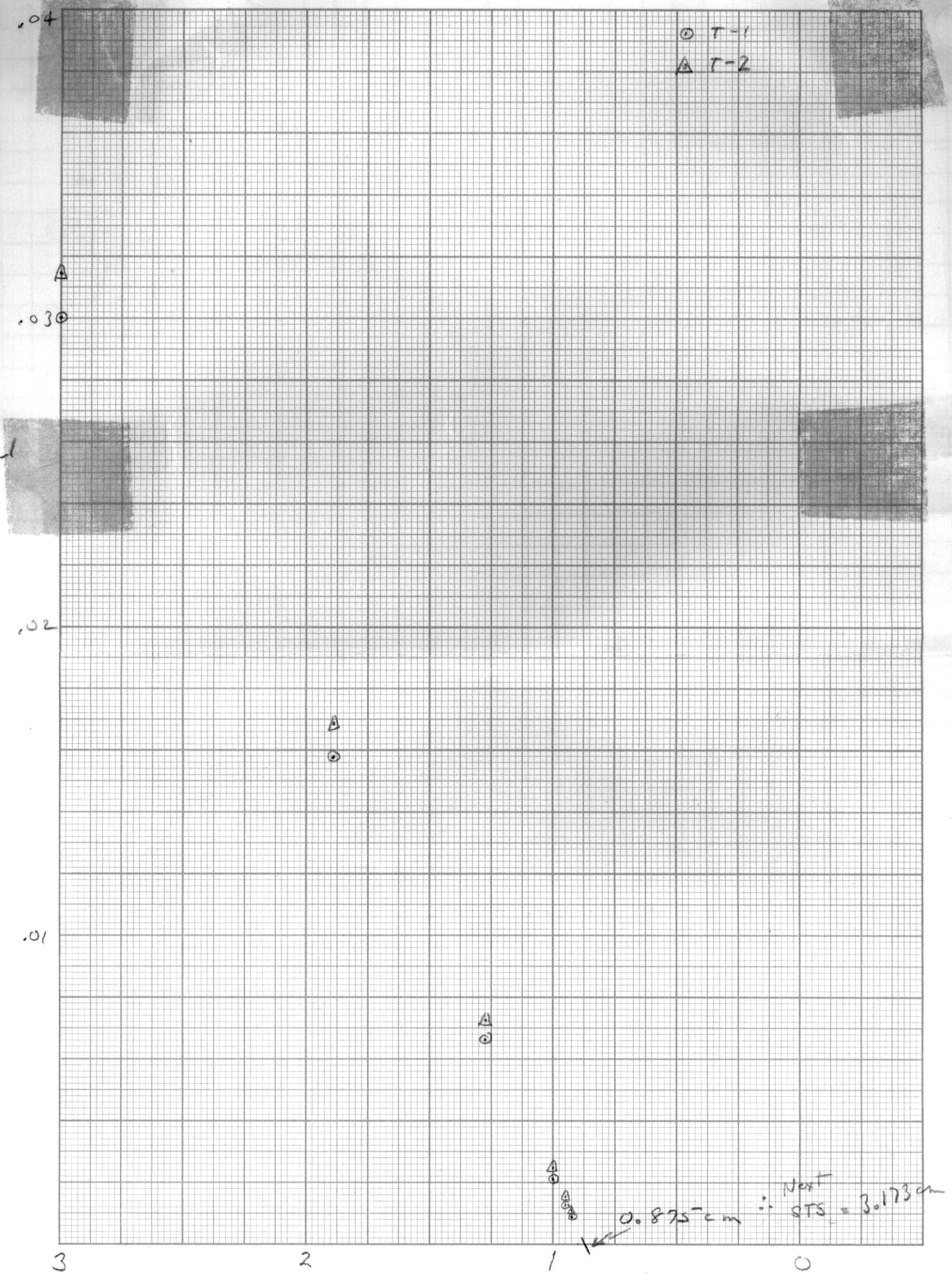
2/3 of Assembly L-17 + L.6D : STS = 3.050 cm



Base Rate = 37.25 $\times 10^{-5}$ n/s

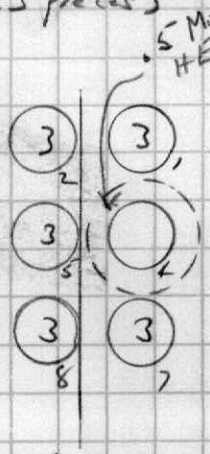
V 0.00	8554	1.29×10^{-5}	188.0	4.94	10846	$.969 \times 10^{-5}$	178.4	4.79
H 9.526	142.6				184.1			
A 15.00								
V 0.00	19531	1.29×10^{-5}	419.9	11.3	25291	$.969 \times 10^{-5}$	408.4	11.0
H 0.00	19817				25237			
	325.5				421.5			

5-13-66 3^3 Assembly L-17 + Al on all cols. STS = 3.050 cm



358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH KEUFFEL & ESSER CO.

2/3 of Assembly L-17 + .5" Mock HE on one Col. 12 cm from the table (3 pieces)



Base Rate = 37.25×10^{-5} n/s

Position	Ch 1	Eff. Factor	10^{-5} n/s	M	Ch 2	Eff. Factor	10^{-5} n/s	M
V 0.00	8383	1.29×10^{-5}	180.2	4.84	10782	$.969 \times 10^{-5}$	174.1	4.67
H 9.536	8329				10717			
A 15.00	139.7				179.7			
V 0.00	19741	1.29×10^{-5}	424.4	11.4	25204	$.969 \times 10^{-5}$	407.1	10.9
H 0.00	19721				25291			
	329.0				420.1			

Assembly L-17 + A1 on all Cols.: STS = 3.050 cm

Base Rate = 55.78×10^{-5} n/s

V 0.00	34019	1.29×10^{-5}	731.4	13.11	43978	$.969 \times 10^{-5}$	710.2	12.73
H 9.527	33707				43602			
A 15.00	566.98				732.96			
V 0.00	86450	1.29×10^{-5}	1858.6	33.3	109960	$.969 \times 10^{-5}$	1775.8	31.8
H 2.999	86058				109423			
	1440.8				1832.6			
V								
V 0.00	164253	1.29×10^{-5}	3532.3	63.3	205141	$.969 \times 10^{-5}$	3313.0	59.4
H 1.880	164795				205530			
	2738.2				3419.0			
V 0.00	393156	1.29×10^{-5}	8452.9	151.5	476909	$.969 \times 10^{-5}$	7698.0	137.9
H 1.272	392855				477307			
	6552.6				7940.1			

Position	Ch_2 T-1	Eff Factor	10^5 r/s	M	Ch_2 T-2	Eff Factor	10^5 r/s	M
V 0.000	1231487	1.29×10^5	26476	479.7	1426933	$.969 \times 10^5$	23045	413.1
H 1.000	1233360				1432420			
	20524				23782			
V 0.000	1967091	1.29×10^5	42291	758.2	2235120	$.969 \times 10^5$	36097	647.1
H 0.950	1963999				2237910			
	32784				37252			
V 0.00	2895859	1.29×10^5	62261	1116.2	3225382	$.969 \times 10^5$	52089	933.8
H 0.925	2888679				3220411			
	48264				53753			

5-16-66 We will now remove the Al and check the basic assembly (Assembly 2-17, $STS_c = 3.05_{in}$)

Base Rate = 55.78×10^5 r/s

V 0.00	28563	1.29×10^5	636.1	11.4	37318	$.969 \times 10^5$	602.6	10.8
H 9.520	4931				6219			

T/C's Room = 74 #2 = 109 #3 = 106

V 0.00	58102	1.29×10^5		22.5	72865	$.969 \times 10^5$		21.0
H 3.000	57591				73077			

T/C's Room = 73 #2 = 105 #3 = 104

V 0.00	2760662	1.29×10^5	~106.4		3380382	$.969 \times 10^5$		~98.0
H 0.500	2750011				3385794			

T/C's Room = 73.5 #2 = 104.5 #3 = 103

→

V 0.00	15175528	1.29×10^5	32627.	585.	17837102	$.969 \times 10^5$	28160.	505.
H 0.100	15250555	25292.			17500715	29061		

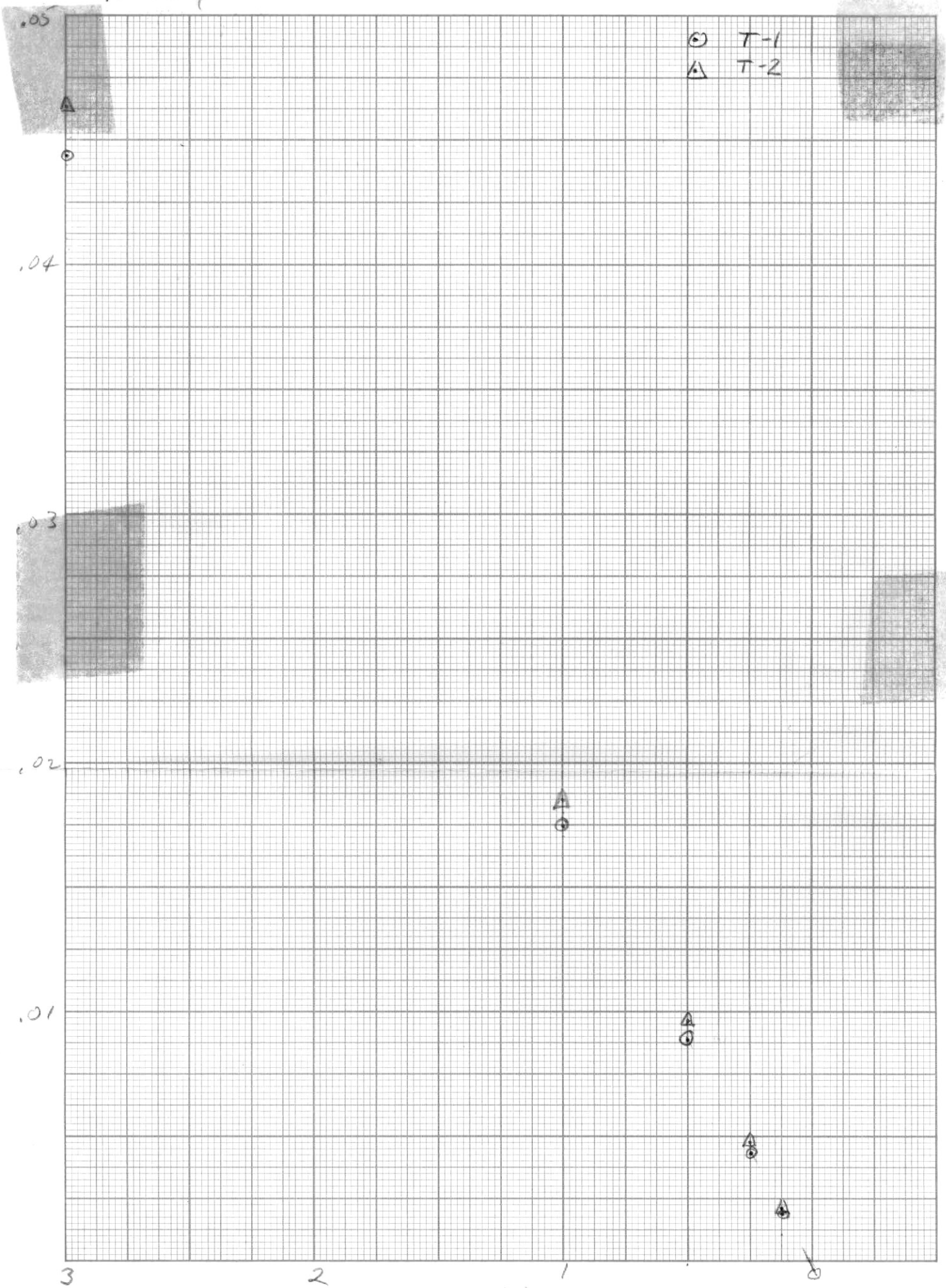
T/C's Room = 74 #2 = 104 #3 = 102

V 0.00	9841183	1.29×10^5	21160	379.	11482782	$.969 \times 10^5$	18544	332.
H 0.150		16403				19137		

T/C's Room = 74 #2 = 104 #3 = 102

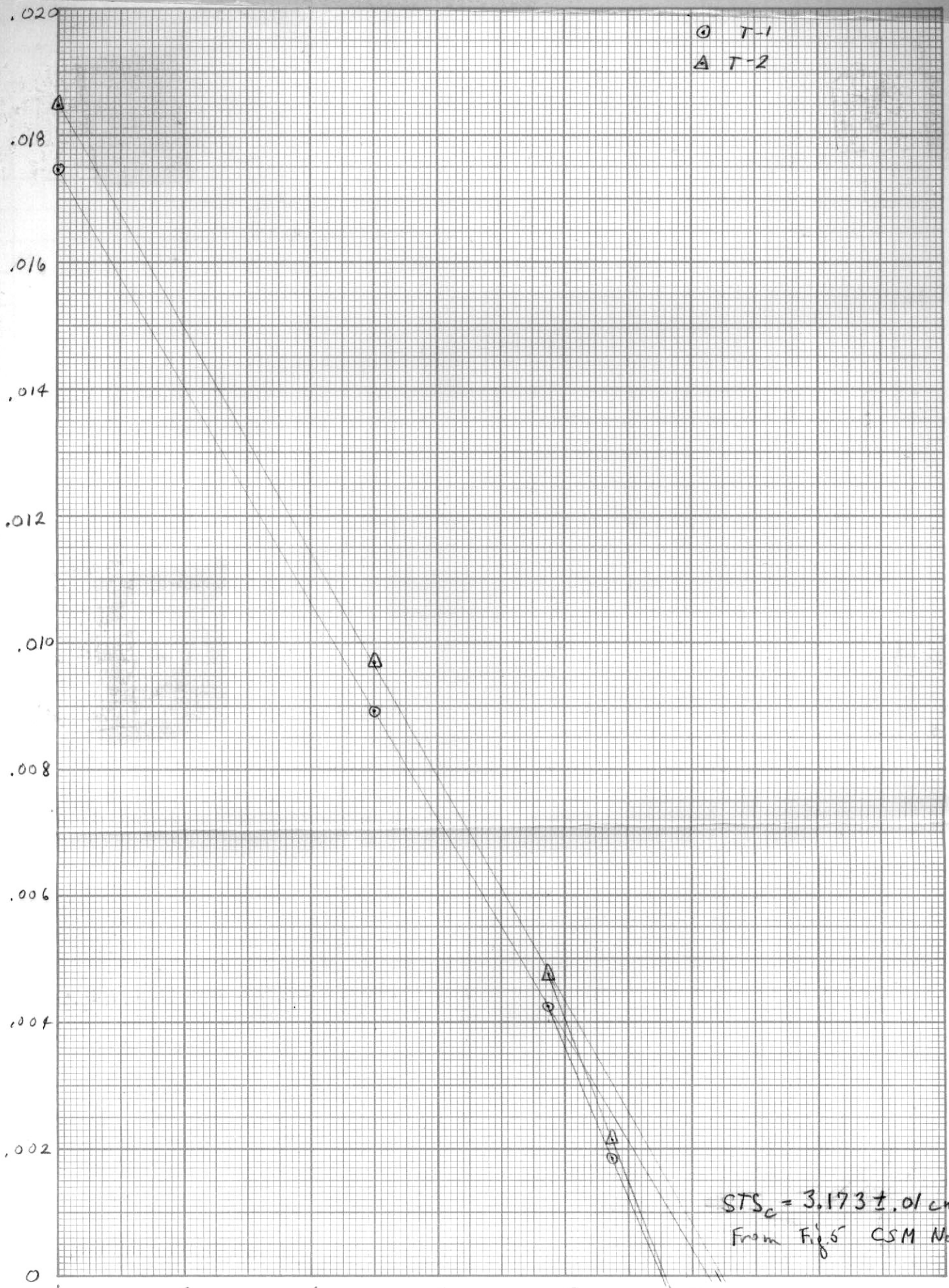
This gave the same $STS_c = 3.050 \pm .010$ cm as previous runs. There was an increase in Mult of 10-15%

5-16-66 Assembly L-17 + A1 on all cols. STS = 3.173 cm



358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH KEUFFEL & ESSER CO.

5-16-66 Assembly L-17 + Al on all Cols. STS = 3.173 cm



$STS_c = 3.173 \pm .01$ cm
From Fig. 5 CSM No. 38

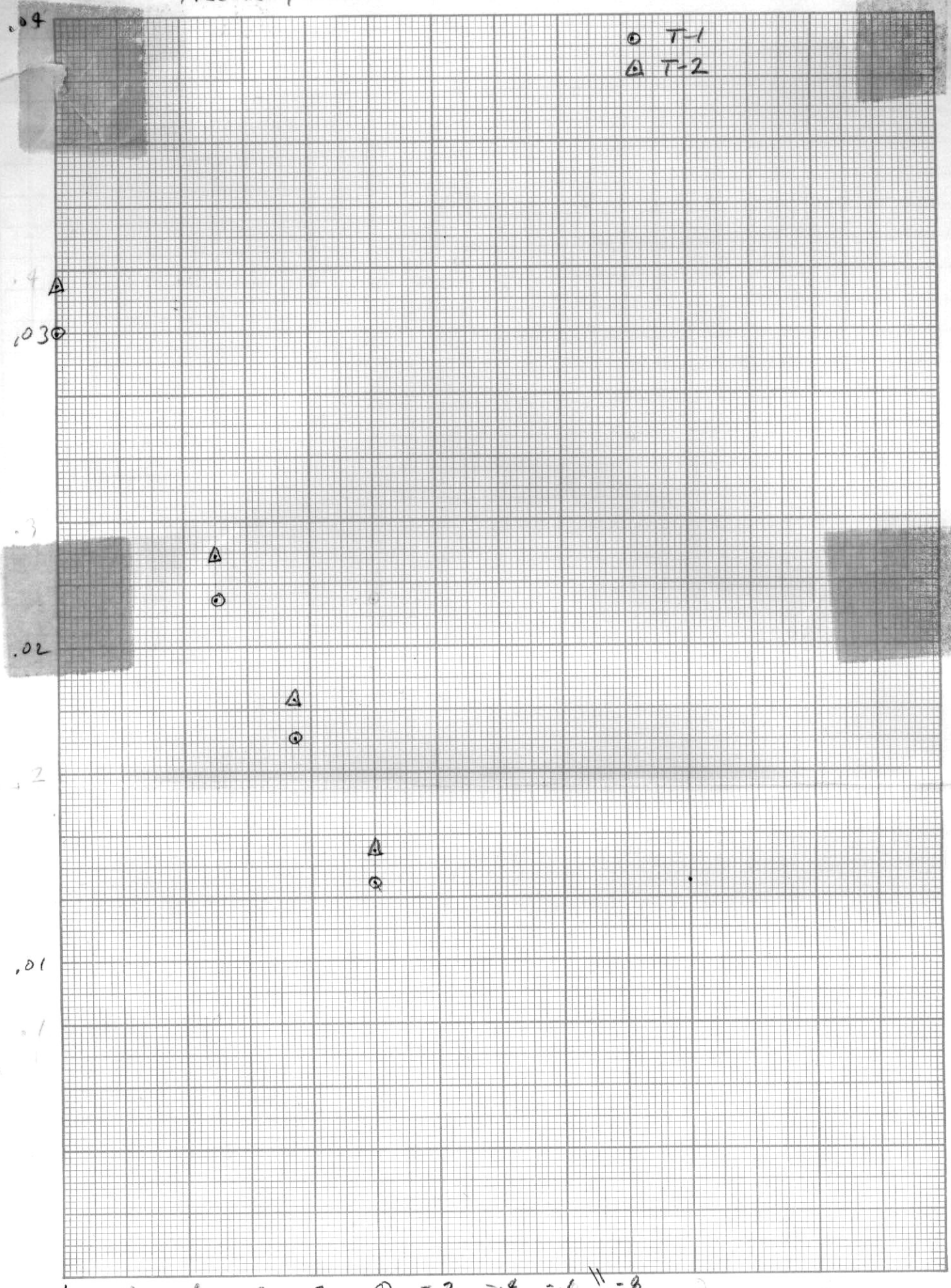
K&E 20 X 20 TO THE INCH KEUFFEL & ESSER CO. 358-10½ MADE IN U.S.A.

Assembly 2-17 + Al on all Cols.: STS = 3.173 cm

Base Rate = 55.78×10^{-5} n/s

Position	Ch T-1	Eff. Fact.	10^{-5} n/s	M	Ch T-2	Eff. Fact.	10^{-5} n/s	M
V 0.00	29437	1.29×10^{-5}	632.9	11.3	36760	$.565 \times 10^{-5}$	593.7	10.6
H 9.53	29239				37493			
	490.6				612.7			
V 0.000	58841	—	1265.1	22.7	78675	—	1206.	21.6
H 2.999	59603				78861			
	980.7				1244.6			
V 0.000	148764	—	3194.6	57.3	186557	—	3017.8	54.1
H 1.000	148854				185932			
	2479.4				3114.3			
V 0.000	290933	—	6255.	112.1	356184	—	5751.7	103.1
H 0.500	290662				357784			
	4848.8				5935.7			
V 0.000	608760	—	13088.	234.6	728063	—	11758	210.8
H .250	613155				735682			
	10186.				12134.			
V 0.000	1385215	—	30213	541.6	1606223	—	26173	469.2
H .125	1400526				1620610			
	23921				27010			

5-17-66 Assembly L-17 + .5" L.6D STS = 3.173 cm



358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH KEUFFEL & ESSER CO.

Assembly L-17 + .5" Li^6D : STS = 3.173 cm

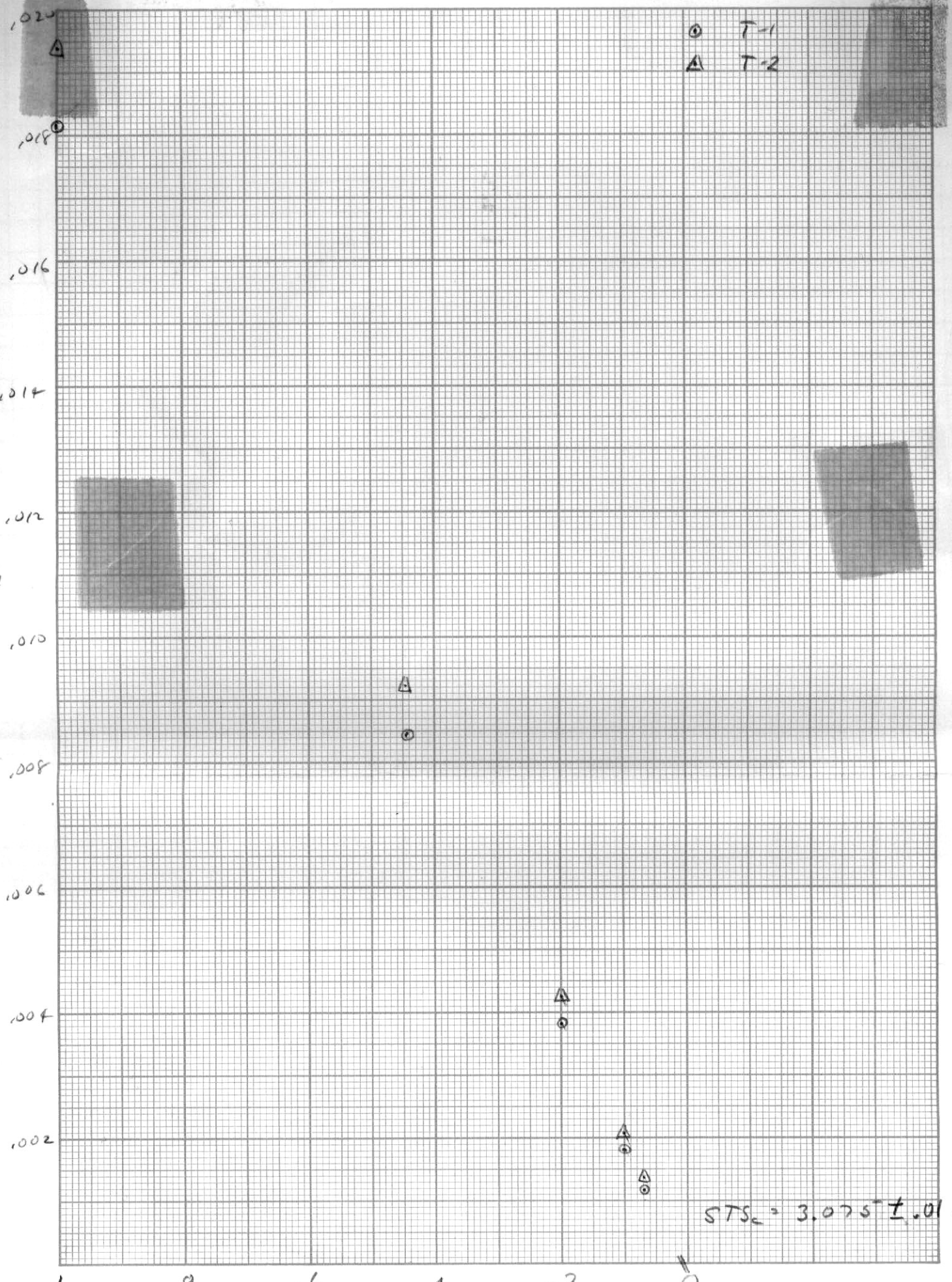
Li^6D : 12" X 12" X .5" Located the same as the run on page 80.

Base Rate = [redacted] $\times 10^{-5}$ n/s

Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V 0.000	25952	1.29×10^{-5}	557.9	10.0	32853	$.969 \times 10^{-5}$	530.6	9.51
H 9.530	26389				33016			
	432.5				547.6			
	T/C's	Room = 74			#2 = 112		#3 = 116	
V 0.000	46698	—	1004.	18.0	59014	—	953.1	17.1
H 3.000	46817				59365			
	778.3				983.6			
	T/C's	Room = 73.5			#2 = 109		#3 = 113	
V 0.000	86345	—	1856.	33.3	109358	—	1766.8	31.7
H 1.000	86880				109877			
	1439.1				1823.3			
	T/C's	Room = 73			#2 = 106		#3 = 110	
V 0.000	120685	—	2594.7	46.5	150801	—	2435.	43.7
H .500	120524				149038			
	2011.4				2513.3			
	T/C's	Room = 73			#2 = 106		#3 = 110	
V 0.000	151605	—	3264	58.5	188453	—	3045.	54.6
H .252	151913				188896			
	2530.0				3142.			
	T/C's	Room = 73			#2 = 105.5		#3 = 105.5	
V 0.000	208436	—	4481.	80.3	256501	—	4142.	74.3
H 0.000	209530				258821			
	3473.9				4275			
	T/C's	Room = 73			#2 = 105.5		#3 = 105.5	

5-17-66 Assembly L-17 + .5" L.16D

STS = 3.075 cm



$STS_c = 3.075 \pm .01$ cm

358-10½ MADE IN U.S.A.

20 X 20 TO THE INCH KEUFFEL & ESSER CO.

Assembly L-17 + .5" L.G.D : STS = 3.075 cm

Located the same as before

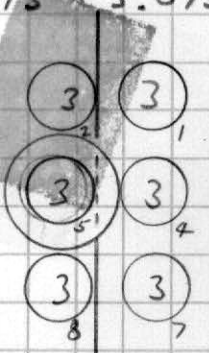
Base Rate = 55.78×10^{-5} n/s

Position	Ch T-1	Eff. Factor	10^{-5} n/s	M	Ch T-2	Eff. Factor	10^{-5} n/s	M
V 0.00	28877	1.29×10^{-5}	620.9	11.13	36701	$.565 \times 10^{-5}$	592.7	10.6
H 9.521	28488				36602			
	481.3				611.7			
	T/C's	Room = 73			#2 = 101		#3 = 110	
V 0.000	61868	—	1330.1	23.85	78649	—	1270.	22.8
H 2.701	62417				78841			
	1031.1				1310.8			
	T/C's	Room = 73.5			#2 = 98		#3 = 105	
V 0.000	142768	—	3069	55.0	177732	—	2870.	51.5
H 1.000	143059				178384			
	2379.4				2562.2			
	T/C's	Room = 73			#2 = 97		#3 = 103	
V 0.000	307022	—	6601	118.3	374664	—	6050.	108.5
H .444	307133				376102			
	5117.				6294.			
	T/C's	Room = 73			#2 = 96		#3 = 101	
V 0.000	681708	—	14657	262.8	811268	—	13102	234.9
H .200	687913				818617			
	11362.				13521			
	T/C's	Room = 73			#2 = 96		#3 = 100.5	
V 0.000	1438862	—	30935	554.6	1663374	—	26863	481.6
H .100	1446031				1667359			
	23981				27722			
	T/C's	Room = 73			#2 = 95.5		#3 = 100	
V 0.000	2202682	—	47355	849.0	2498526	—	40356	723.5
H 0.070	2211875				2507902			
	36709				41647			
	T/C's	Room = 73			#2 = 95		#3 = 99.5	

We will now continue the safety experiments for putting .5" Mock HE on the center Col. in Assembly A-17 with STS = 3.075" cm

We will look at 2/3 of the assembly with mock HE (.5") as shown below. STS = 3.075 cm
The center mock HE plugs were centered between the parts. Mock HE around all 3 parts of Col. 5.

Base Rate = 37.25×10^{-5} n/s



Position	Cs^{137}-1	Eff. Factor	10^5 n/s	M	Cs^{137}-2	Eff Factor	10^5 n/s	M
V 0.000	8787	1.25×10^{-5}	189.0	5.07	10581	$.969 \times 10^{-5}$	176.7	4.74
H 9.527	8647				10392			
	146.5				182.4			
V 0.00	20820	—	447.6	12.0	26124	—	421.9	11.3
H 0.00	20952				26030			
	347.0				435.4			

5-18-66

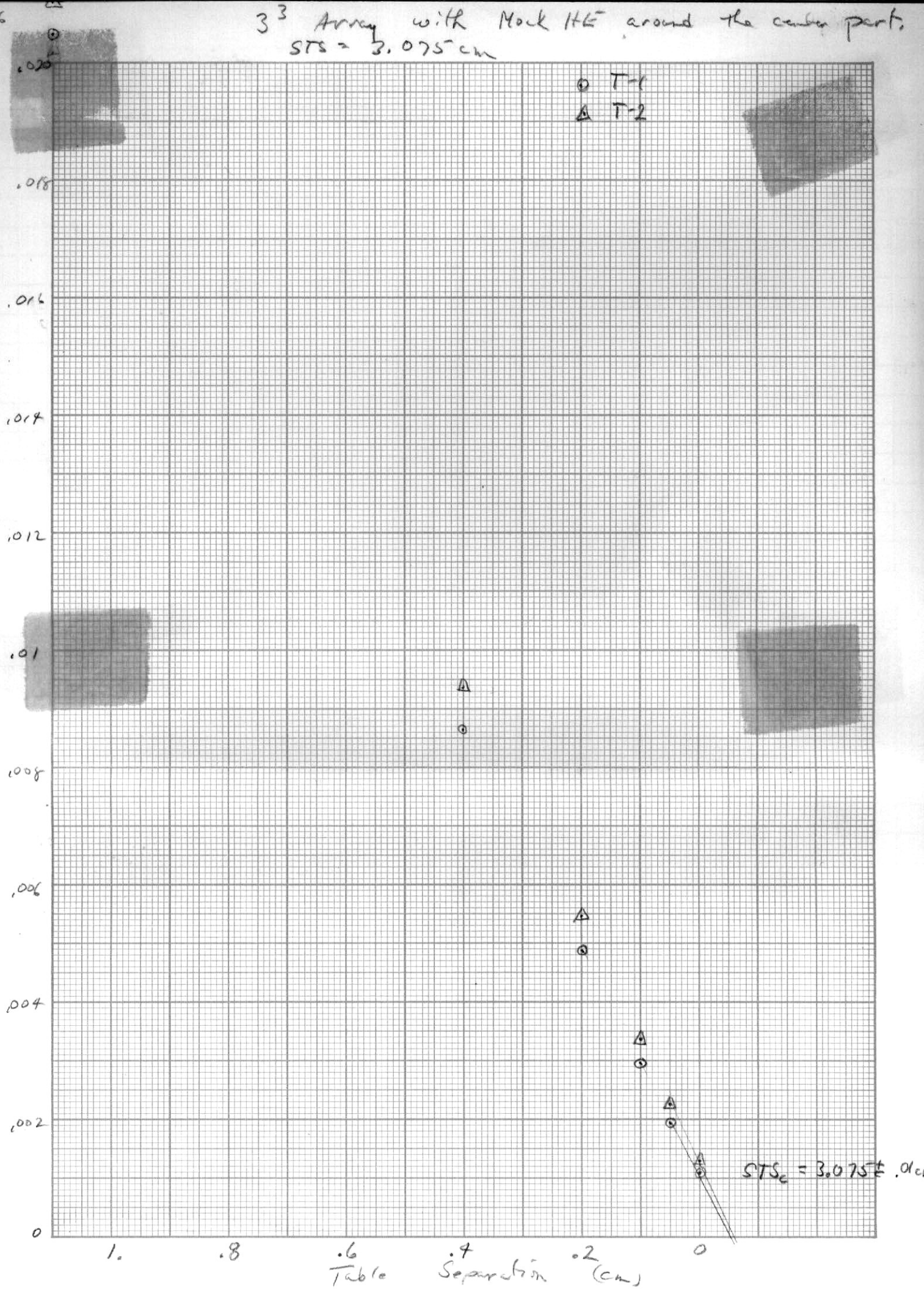
We will do a run as above but with Mock HE around only the center part of Col. 5.

Base Rate = 37.25×10^{-5} n/s

V 0.000	7908	1.25×10^{-5}	170.0	4.56	10221	$.969 \times 10^{-5}$	165.1	4.43
H 9.527	7794				10186			
	131.8				170.4			
V 0.000	16331	—	351.1	9.43	21385	—	345.8	9.27
H 0.000	16435				21358			
	272.2				356.4			

5-18-66

3^3 Array with Mock HE around the center part.
STS = 3.075 cm



358-10½ MADE IN U.S.A.
20 X 20 TO THE INCH
KEUFFEL & ESSER CO.

We will now do the 3³ array with Mock Hf around the center part. STS = 3.075 cm

Base Rate = 55.78 × 10^5 γ/s

Position	Ch T-1	Eff. Factor	10^5 γ/s	M	Ch T-2	Eff. Factor	10^5 γ/s	M
V 0.00	295736	1.29×10^{-5}	635.1	11.4	379/6	$.969 \times 10^{-5}$	612.3	11.0
H 9.473	296883				38359			
	492.3				631.9			
V 0.000	57636	—	1239.2	22.2	73848	—	1185.7	21.3
H 2.559	57828				73661			
	960.6				1223.6			
V 0.000	126315	—	2715.7	48.7	158185	—	2636.8	47.3
H 1.100	127067				158857			
	2105.2							
V 0.000								
V 0.000	300680	—	6465	115.9	367701	—	5938.3	106.5
H .400	302448				368728			
	5011.3				6128.3			
V 0.000	531376	—	11424.	204.8	630906	—	10184	182.7
H .199	530426				635816			
	8856.				10515.			
V 0.000	872559	—	18768.	338.3	1026530	—	16578	297.2
H .100	865081				1035152			
	14626.				17108.			
V 0.000	1330588	—	28607.	512.9	1536631	—	24816.	444.9
H .050	1336977				1539002			
	22176.				25610.			
V 0.000	2353837	—	50607	907.3	2647904	—	42763.	766.6
H 0.000	2378121				2675922			
	39230				44131.			

5/20/66 Prepared for new experiments. Set up 3^5 array.

Repeat of basic assembly L-17 : STS = 3.052 cm

Set up with fission probe system and Rossi & counters.
fission probe extended through at parting plane aligned with center of hollow
Base rate 55.78×10^5 n/s / plane of part

Position	Cts T-1	Eff Factor	10^5 n/s	M	Cts T-2	Eff Factor	10^5 n/s	M
V 0.00	25119	1.29×10^{-5}	5540.0	9.68	37009	0.969×10^{-5}	5497.7	10.72
H 9.53	24893				36949			
	418.6				6168			
	T/Cs Room - 71				#2 - 112		#3 - 119	
V 0.00	46441	—	998.5	17.90	72554	—	1171.5	21.0
H 3.00	46562				72512			
	774.0				1209			
	T/C's Room - 71				#2 - 111		#3 - 119	
V 0.00	103716	—	2229.9	39.97	161094	—	2601.7	46.64
H 1.100	103172				161204			
	1728.6				26849			
	T/C's Room - 71				#2 - 110		#3 - 118	
V 0.00	210065	—	4516.4	80.97	323933	—	5231.5	93.79
H 0.500	208839				321700			0.01066
	3501.1				53989			
	T/C's Room - 71				#2 - 109		#3 - 117	
V 0.00	494575	—	10633	190.6	736483	—	11894	213.23
H 0.199	496676				735861			0.00468
	8242.9				12275			
	T/C's Room - 71				#2 - 109		#3 - 116	
V 0.00	1086263	—	23354	418.7	1547764	—	24996	448.1
H 0.085	1090159				1554191			0.00223
	18104				25796			
	T/C's							

SHUT DOWN for LUNCH

135

Calibration for fission probe N-S

Number is position of probe end

	(cm)						
	-3.000	53.9		11.000	353.4	28.000	632.6
	-2.000	75.2					
				12.000	374.8	25.000	654.0
	-1.000	96.6					
			21.4	13.000	396.2	edge -25.945-	672.4
South edge of can	-0.000	118.0 ✓		can ℄ 13.145	398.9	26.000	675.9
edge of can	.345	125.4 ✓				North edge -26.250	679.8
	1.000	139.4 ✓		14.000	418.6		
	1.500	150.1 ✓				27.00	696.8
	2.000	160.8		15.000	440.0		
	2.500	171.5				28.00	718.2
	3.000	182.2		16.000	461.4		
Center of can ℄	3.595	194.8		edge 16.395	468.4	29.000	739.6
	4.000	203.6			4 +- 3		
				17.000	482.8	30.000	761.
	5.000	225.0					
	5.5	235.7		void ℄ 17.920	501.0	31.000	782.4
	6.000	246.4		18.000	504.2		
	6.5	257.1					
edge —	6.845	264.3		19.000	525.6		
	7.000	267.8		edge 19.445	533.5		
	7.5	278.5					
	8.000	289.2 ✓		20.000	547.0		
center of void	8.370	296.9					
				21.000	568.4		
	9.000	310.6					
				22.000	589.8		
edge —	9.895	329.5					
	10.000	332.0		can ℄ 22.695	603.0		
	10.5	342.7		23.000	611.2		

We will now close previous assembly and take a flux traverse with a U^{235} fission probe located as previously described.

	Position	Cts T-1	Eff. Factor	10^5 n/s	M	Cts T-2	Eff. Factor	10^5 n/s	M
V	0.000	25954	1.25×10^5			37503	$.969 \times 10^5$		
H	9.511	25719				36420			
A	15.000								

T/C's Room = 72 #2 = 118 #3 = 125

We were on a period at closure ∴ we separated the table and ran the control actuator in.

Crit and level @ H = .022 cm
A = 4.680 cm

Power = 2%

Beckman #1 = .6 $\times 10^{-7}$
Beckman #2 = .5 $\times 10^{-7}$

Rams #1 = .2 r/hr #2 = .5 r/hr #3 = .5 r/hr
#4 = .3 r/hr #5 = .25 r/hr

T/C's Room = 72 #2 = 108 #3 = 114

We will now do the fission traverse.

(cm)	U^{235} Cts/1,500,000 Cts TUB	Normalized to 13.145
-2.000	12259	.3699
-1.000	13799	.4164
0.000	15530	.4686
.345	16047	.4825
1.000	18023	.5439

	(cm)	Probe / Tub	Norm. to 13.145
	1.500	19503	.5885
	2.000	20862	.6296
	3.000	23451	.7077
can ℄	3.595	24831	.7493
	4.000	25106	.7576
	5.000	26043	.7859
	6.000	26011	.7849
edge	6.845	25672	.7747
	7.000	25666	.7745
	8.000	25639	.7737
coil ℄	8.370	* 25570 (had to repeat to get this)	.7716
	9.000	26490	.7994
		26728	.8066
edge	9.895	27660	.8347
	10.000	28300	.8540
	11.000	30215	.9118
	12.000	31776	.9589
	13.000	33021	.9965
can ℄	13.145	33137	1.0000
	14.000	32697	.9867
	15.000	31299	.9445

O = .00118

54.27/in = 21.37/cm

10.69

.00135 - O South Side
.00700 - 16 3/4 North Side

	cm	Probe/TUB	Norm. to 13.145
	16.000	29398	.8871
edge	16.395⁻	28726	.8669
			Power started up
	17.000	27814	.8393
void ℄	17.920	26897	.8117
	18.000	26964	.8137
	19.000	26513	.8001
edge	19.485⁻	26731	.8067
	20.000	27279	.8232
	21.000	27428	.8277
	22.000	27097	.8177
can ℄	22.695⁻	26716	.8062
	23.000	25912	.7819
	24.000	23418	.7067
	25.000	20404	.6157
edge	25.945	18177	.5485⁻
	26.000	17878	.5395⁻
	26.290	17421	.5257
	27.000	15589	.4704 Power going down
	28.000	13825⁻	.4172
	29.000	12405⁻	.3743
	30.000	10968	.3309
	31.000	9996	.3016

5-24-66 We will continue the flux traverses of the previous assembly 2-17 : STS = 3.052 cm

Fast Stop T-1 = 21755 T-2 = 36262

This was taken after we changed the amplifier of T-1 so that the pulses of T-1 = T-2 equal about 10 volts.

With T-1 set to about 25 volts
T-1 = 25705

We will leave the amplifier of T-1 set to give about 10 volt pulses.

We will now continue.

T/C's Room = 73 #2 = 112 #3 = 119

Crit @ H = .022 cm
and level A = 4.192 cm

Power = 20 %

Beckman #1 = 5.5 $\times 10^{-8}$

Beckman #2 = 5.0 $\times 10^{-8}$

Rams #1 = .18 #2 = .5 #3 = .5

#4 = .3 #5 = .2

T/C's Room = 72 #2 = 105 #3 = 110

Flux Traverse

cm	V^{235} cts / 1,500,000 cts TUB	Norm. to 1st run @ 13.145 (33137 cts)
-3.000	11753	.35 #7
-2.000	13230	.3992

cm	Probe/TUB	Nonm.	
-1.000	15158	.4574	
0.000	16481	.4973	
.345	17717	.5346	
1.000	19183	.5789	
2.000	22053	.6655	Power going down
3.000	—	—	
3.595	25822	.7792	
4.000	—		
5.000	27528	.8307	
6.000	27763	.8378	
6.845	27618	.8334	
8.370	28288	.8536	
9.000	29297	.8841	
9.895	30716	.9269	
11.000	33054	.9975	
12.000	{33333 35497, 34941}	1.0059 1.0712, 1.0548	Power going up
13.145	35174 34959, 34745	1.0614	
14.000	35506 36284, 36528	1.0715	
15.000	34661	1.0460	
16.395			

cm	Probe/TUB	Norm	
17.000	32806	.9900	
17.920	31748	.9581	
19.000	30695	.9263	
19.445			
20.000			
21.000	30637	.9245	
22.000	29968	.9043	Power going up
22.695			
23.000			
24.000	26056	.7863	
25.000			
25.945			
26.000	20551	.6202	
26.290			
27.000			
28.000	16358	.4936	
29.000			
30.000	13071	.3944	
31.000			